

FCC Test Report

Product Name	Vehicle Modem
Model No.	FDK32TU
FCC ID.	AZP-FDK32TU

Applicant	FUTABA CORPORATION
Address	629 Oshiba, Mobara, Chiba Prefecture 297-8588, Japan

Date of Receipt	Dec. 16, 2021
Issued Date	Feb. 21, 2022
Report No.	21C0601R-RFUSOTHV02-A
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

Issued Date: Feb. 21, 2022

Report No.: 21C0601R-RFUSOTHV02-A



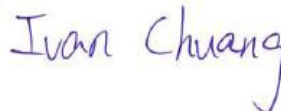
Product Name	Vehicle Modem
Applicant	FUTABA CORPORATION
Address	629 Oshiba, Mobara, Chiba Prefecture 297-8588, Japan
Manufacturer	FUTABA CORPORATION
Model No.	FDK32TU
FCC ID.	AZP-FDK32TU
EUT Rated Voltage	DC 24V
EUT Test Voltage	DC 24V
Trade Name	Futaba
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :



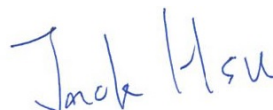
(Senior Project Specialist / Joanne Lin)

Tested By :



(Senior Engineer / Ivan Chuang)

Approved By :



(Senior Engineer / Jack Hsu)

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Revision History

Report No.	Version	Description	Issued Date
21C0601R-RFUSOTHV02-A	V1.0	Initial issue of report.	2022-02-21

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Vehicle Modem
Trade Name	Futaba
Model No.	FDK32TU
FCC ID.	AZP-FDK32TU
Frequency Range	151MHz-156MHz, 302MHz-321MHz
Type of Modulation	FSK / OFDM
Type of antenna	Coupler Antenna

Frequency of Each Channel:

FSK Mode:

Channel No.	Frequency		Channel No.	Frequency	
	Down-link [MHz]	Up-link [MHz]		Down-link [MHz]	Up-link [MHz]
1	230.05	151.05	26	232.55	153.55
2	230.15	151.15	27	232.65	153.65
3	230.25	151.25	28	232.75	153.75
4	230.35	151.35	29	232.85	153.85
5	230.45	151.45	30	232.95	153.95
6	230.55	151.55	31	233.05	154.05
7	230.65	151.65	32	233.15	154.15
8	230.75	151.75	33	233.25	154.25
9	230.85	151.85	34	233.35	154.35
10	230.95	151.95	35	233.45	154.45
11	231.05	152.05	36	233.55	154.55
12	231.15	152.15	37	233.65	154.65
13	231.25	152.25	38	233.75	154.75
14	231.35	152.35	39	233.85	154.85
15	231.45	152.45	40	233.95	154.95
16	231.55	152.55	41	234.05	155.05
17	231.65	152.65	42	234.15	155.15
18	231.75	152.75	43	234.25	155.25
19	231.85	152.85	44	234.35	155.35
20	231.95	152.95	45	234.45	155.45
21	232.05	153.05	46	234.55	155.55
22	232.15	153.15	47	234.65	155.65
23	232.25	153.25	48	234.75	155.75
24	232.35	153.35	49	234.85	155.85
25	232.45	153.45	50	234.95	155.95

Low Speed OFDM Mode:

Channel No.	Frequency		Channel No.	Frequency	
	Down-link [MHz]	Up-link [MHz]		Down-link [MHz]	Up-link [MHz]
51	230.05	151.05	76	232.55	153.55
52	230.15	151.15	77	232.65	153.65
53	230.25	151.25	78	232.75	153.75
54	230.35	151.35	79	232.85	153.85
55	230.45	151.45	80	232.95	153.95
56	230.55	151.55	81	233.05	154.05
57	230.65	151.65	82	233.15	154.15
58	230.75	151.75	83	233.25	154.25
59	230.85	151.85	84	233.35	154.35
60	230.95	151.95	85	233.45	154.45
61	231.05	152.05	86	233.55	154.55
62	231.15	152.15	87	233.65	154.65
63	231.25	152.25	88	233.75	154.75
64	231.35	152.35	89	233.85	154.85
65	231.45	152.45	90	233.95	154.95
66	231.55	152.55	91	234.05	155.05
67	231.65	152.65	92	234.15	155.15
68	231.75	152.75	93	234.25	155.25
69	231.85	152.85	94	234.35	155.35
70	231.95	152.95	95	234.45	155.45
71	232.05	153.05	96	234.55	155.55
72	232.15	153.15	97	234.65	155.65
73	232.25	153.25	98	234.75	155.75
74	232.35	153.35	99	234.85	155.85
75	232.45	153.45	100	234.95	155.95

High Speed OFDM Mode:

Channel No.	Frequency [MHz]
101	302
102	303
103	304
104	305
105	306
106	307
107	308
108	309
109	310
110	311
111	312
112	313
113	314
114	315
115	316
116	317
117	318
118	319
119	320
120	321

Note:

1. The EUT is a Vehicle Modem with a built-in 151-156MHz, 302-321MHz transceiver.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.209.
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit
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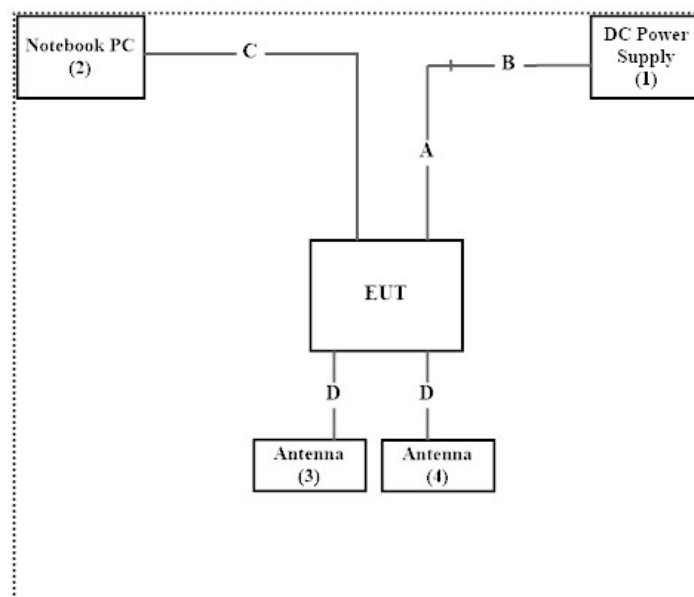
1.2. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 DC Power Supply	KEYSIGHT	E36234A	MY59001234	Non-Shielded, 1.8m
2 Notebook PC	DELL	Latitude 5501	4H94P13	N/A
3 Antenna	Futaba	FZE32EU010	N/A	N/A
4 Antenna	Futaba	FZE32EU010	N/A	N/A

Signal Cable Type	Signal cable Description
A Power Cable	Non-shielded, 1.05m
B Power Cable	Non-shielded, 2m
C RS232 to USB Cable	Shielded, 0.4m
D Antenna Cable	Non-shielded, 0.8m

1.3. Configuration of Test System



1.4. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.3.
- (2) Execute program “FutabaTerm V2.0.0.2” on the Notebook PC.
- (3) Start the continuous transmitter.
- (4) Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	20.5°C
	Humidity (%RH)	10~90 %	66.8%
Radiated Emission	Temperature (°C)	10~40 °C	21°C
	Humidity (%RH)	10~90 %	60%

USA : FCC Registration Number: TW0033

Canada : IC Registration Number: 26930

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No. 5-22, Ruishukeng Linkou District, New Taipei City, 24451, Taiwan
Performed Location : No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan,
R.O.C.
Phone number : +886-3-275-7255
Fax number : +866-3-327-8031
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.6. List of Test Equipment

For Conduction measurements /SH1

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	EMI Test Receiver	R&S	ESR7	101601	2021.06.19	2022.06.18
X	Two-Line V-Network	R&S	ENV216	101306	2021.04.08	2022.04.07
X	Two-Line V-Network	R&S	ENV216	101307	2021.05.04	2022.05.03
X	Coaxial Cable	SUHNER	RG400_BNC	RF001	2021.05.24	2022.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : AUDIX e3 V9

For Radiated measurements /966-1

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Loop Antenna	AMETEK	HLA6121	56736	2021.04.14	2022.04.13
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-675	2021.08.11	2022.08.10
X	Horn Antenna	ETS-Lindgren	3117	00201259	2021.11.09	2022.11.08
	Horn Antenna	Com-Power	AH-840	101087	2021.06.18	2022.06.17
X	Pre-Amplifier	EMCI	EMC001330	980254	2021.01.20	2022.01.19
X	Pre-Amplifier	EMCI	EMC051835SE	980312	2021.02.24	2022.02.23
	Pre-Amplifier	EMCI	EMC05820SE	980362	2021.08.24	2022.08.23
	Pre-Amplifier	EMCI	EMC184045SE	980369		
	Coaxial Cable	EMCI	EMC102-KM-KM-600	1160314	2021.04.27	2022.04.26
	Coaxial Cable	EMCI	EMC102-KM-KM-7000	170242		
	Filter	MICRO TRONICS	BRM50702	G251	2021.09.16	2022.09.15
	Filter	MICRO TRONICS	BRM50716	G188	2021.09.16	2022.09.15
X	EMI Test Receiver	R&S	ESR	102792	2021.12.15	2022.12.14
X	Spectrum Analyzer	R&S	FSV3044	101113	2021.02.04	2022.02.03
X	Coaxial Cable	SUHNER	SUCOFLEX 106	25450/6	2021.03.05	2021.03.04
	Coaxial Cable	SGH	HA800	GD20110222-8		
	Coaxial Cable	SGH	SGH18	2021003-8		
	Coaxial Cable	EMCI	EMC106	151113		

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : AUDIX e3 V9.

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

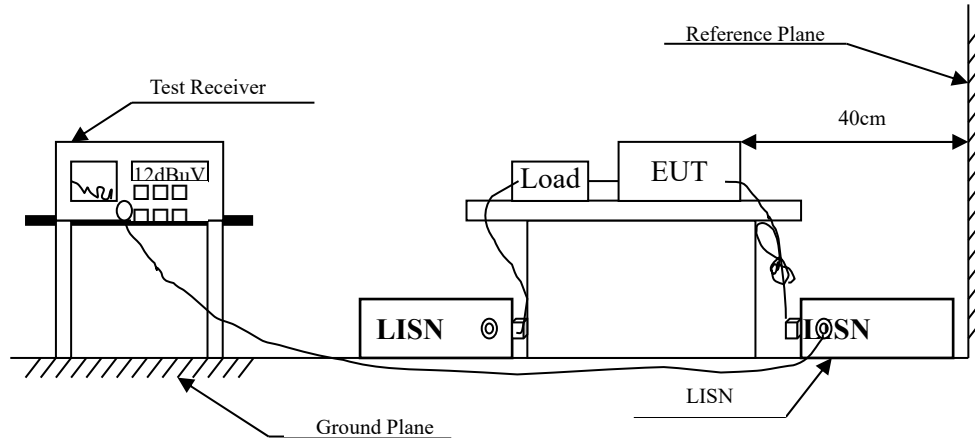
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
Conducted Emission	± 3.42 dB	
Radiated Emission	Under 1GHz ± 4.06 dB	Above 1GHz ± 3.73 dB

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB μ V) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56 _(註)	56-46 _(註)
0.50-5.0	56	46
5.0 - 30	60	50

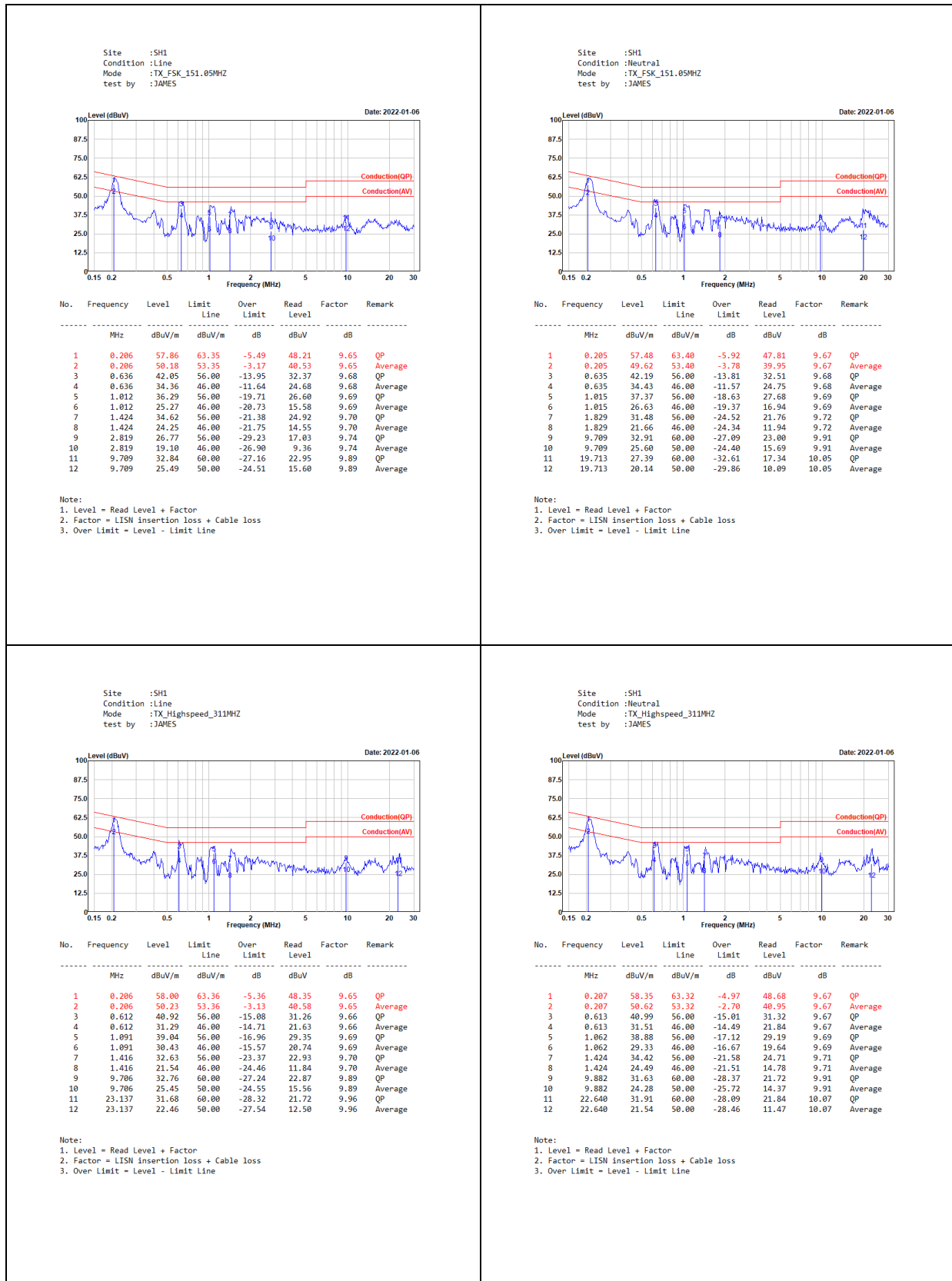
2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

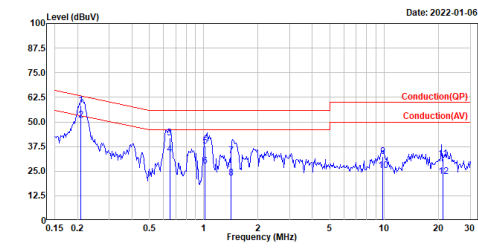
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.4. Test Result of Conducted Emission



Site :SH1
Condition :Line
Mode :TX Lowspeed_151.05MHz
test by :JAMES

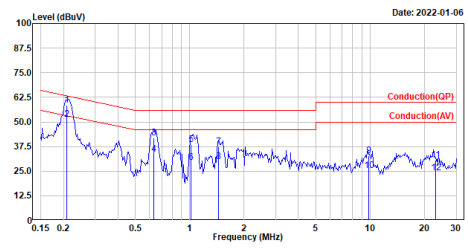


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	0.209	58.56	63.25	-4.69	48.91	9.65	QP
2	0.209	51.04	53.25	-2.21	41.39	9.65	Average
3	0.648	41.70	56.00	-14.30	32.02	9.68	QP
4	0.648	33.51	46.00	-12.49	23.83	9.68	Average
5	1.016	37.61	56.00	-18.39	27.92	9.69	QP
6	1.016	27.68	46.00	-18.32	17.99	9.69	Average
7	1.416	32.72	56.00	-23.28	23.02	9.70	QP
8	1.416	21.56	46.00	-24.44	11.86	9.70	Average
9	9.796	32.49	60.00	-27.51	22.60	9.89	QP
10	9.796	25.29	50.00	-24.71	15.40	9.89	Average
11	21.166	31.40	60.00	-28.60	21.43	9.97	QP
12	21.166	22.36	50.00	-27.64	12.39	9.97	Average

Note:

1. Level = Read Level + Factor
2. Factor = LISN insertion loss + Cable loss
3. Over Limit = Level - Limit Line

Site :SH1
Condition :Neutral
Mode :TX Lowspeed_151.05MHz
test by :JAMES



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	0.210	58.66	63.22	-4.56	48.99	9.67	QP
2	0.210	51.24	53.22	-1.98	41.57	9.67	Average
3	0.630	42.06	56.00	-13.94	32.38	9.68	QP
4	0.630	33.62	46.00	-12.38	23.94	9.68	Average
5	1.019	38.37	56.00	-17.63	28.68	9.69	QP
6	1.019	29.32	46.00	-16.68	19.63	9.69	Average
7	1.450	37.48	56.00	-18.52	27.77	9.71	QP
8	1.450	29.84	46.00	-16.16	20.13	9.71	Average
9	9.797	32.66	60.00	-27.34	22.75	9.91	QP
10	9.797	25.36	50.00	-24.64	15.45	9.91	Average
11	22.996	30.57	60.00	-29.43	20.50	10.07	QP
12	22.996	24.29	50.00	-25.71	14.22	10.07	Average

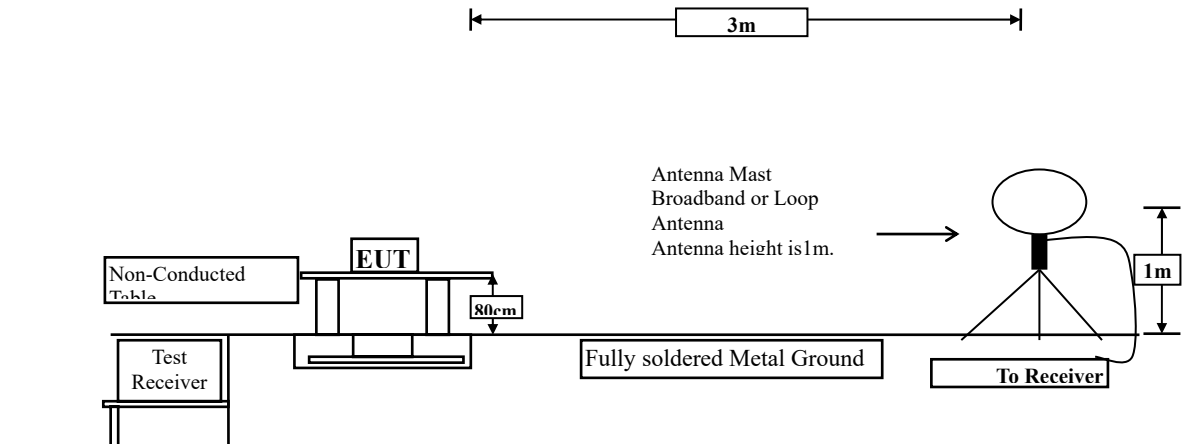
Note:

1. Level = Read Level + Factor
2. Factor = LISN insertion loss + Cable loss
3. Over Limit = Level - Limit Line

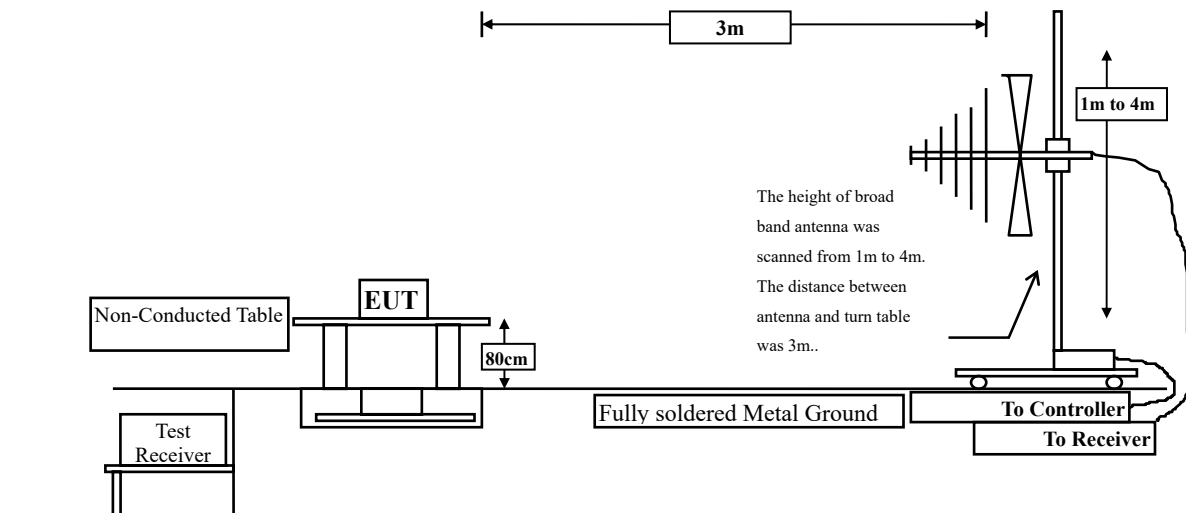
3. Radiated Emission

3.1. Test Setup

Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



3.2. Limits

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks :

1. RF Voltage (dB μ V) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.209 requirements.

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

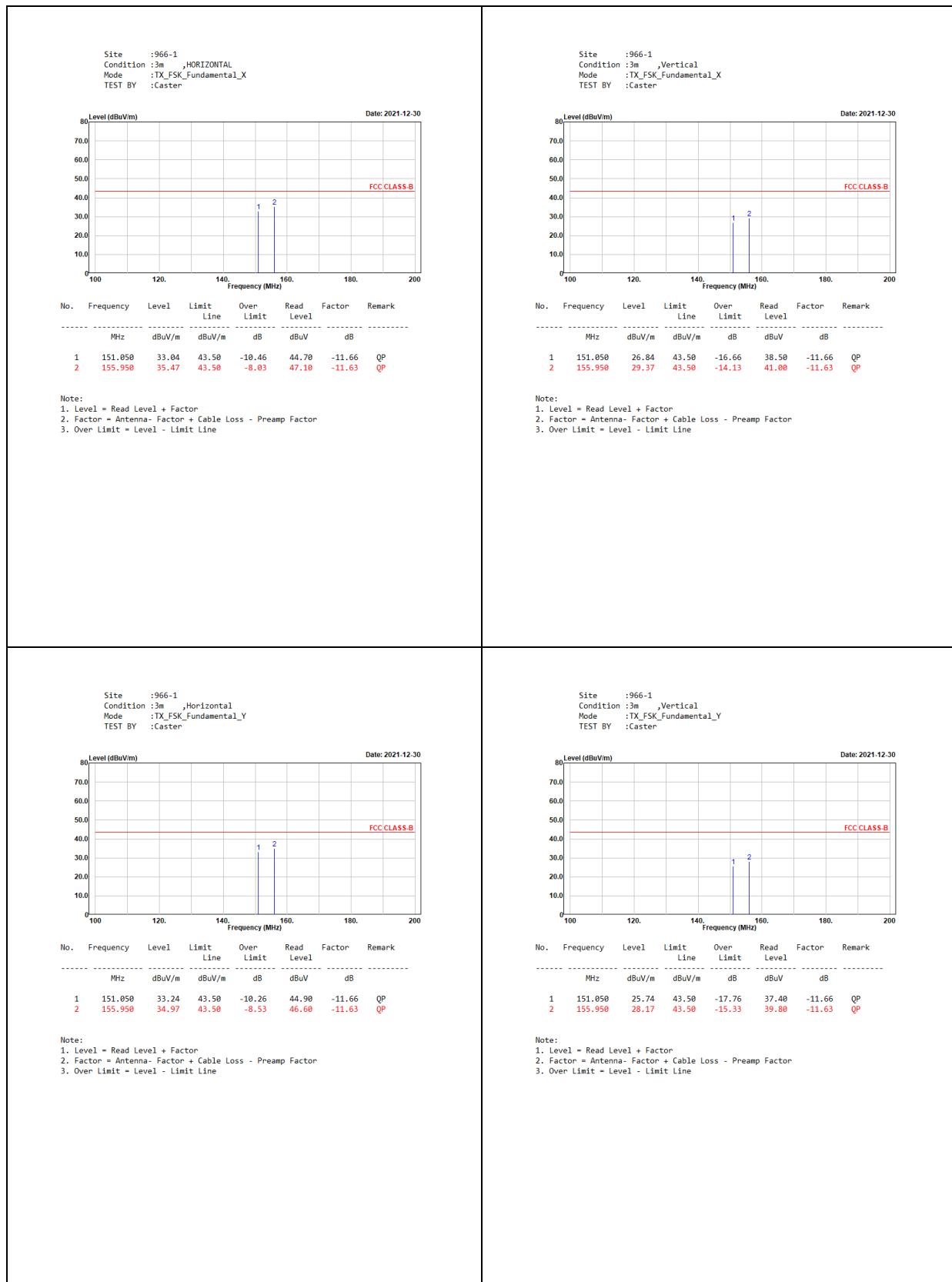
The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

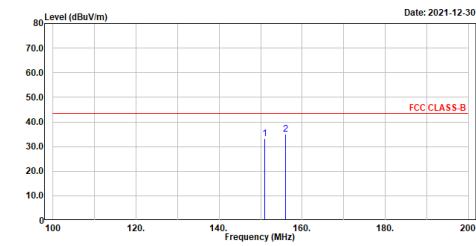
The worst radiated emission is measured on the Final Measurement.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

3.4. Test Result of Radiated Emission



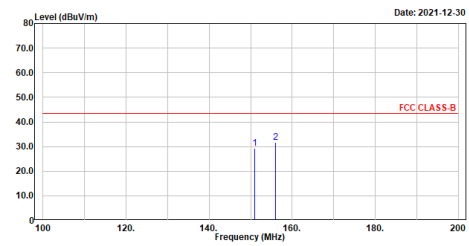
Site :966-1
Condition :3m ,Horizontal
Mode :TX_FSK_Fundamental_Z
TEST BY :Caster



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	151.050	33.14	43.50	-10.36	44.80	-11.66	QP
2	155.950	35.17	43.50	-8.33	46.80	-11.63	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

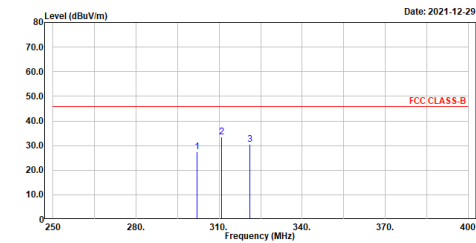
Site :966-1
Condition :3m ,Vertical
Mode :TX_FSK_Fundamental_Z
TEST BY :Caster



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	151.050	29.34	43.50	-14.16	41.00	-11.66	QP
2	155.950	31.67	43.50	-11.83	43.30	-11.63	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

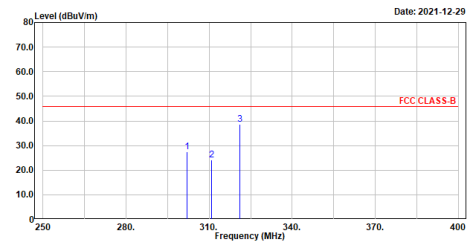
Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Highspeed_Fundamental_X
TEST BY :Johnny



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	302.000	27.36	46.00	-18.64	38.50	-11.14	QP
2	311.000	33.48	46.00	-12.52	44.30	-10.82	QP
3	321.000	30.46	46.00	-15.54	40.90	-10.44	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

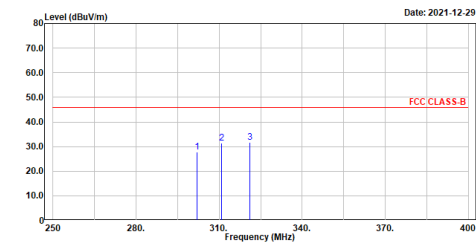
Site :966-1
Condition :3m ,Vertical
Mode :TX_Highspeed_Fundamental_X
TEST BY :Johnny



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	302.000	27.46	46.00	-18.54	38.60	-11.14	QP
2	311.000	24.08	46.00	-21.92	34.90	-10.82	QP
3	321.000	38.76	46.00	-7.24	49.20	-10.44	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Highspeed_Fundamental_Y
TEST BY :Johnny

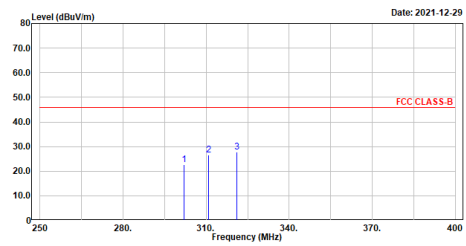


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB	
1	302.000	27.76	46.00	-18.24	38.90	-11.14	QP
2	311.000	31.48	46.00	-14.52	42.30	-10.82	QP
3	321.000	31.75	46.00	-14.25	42.19	-10.44	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,Vertical
Mode :TX_Highspeed_Fundamental_Y
TEST BY :Johnny

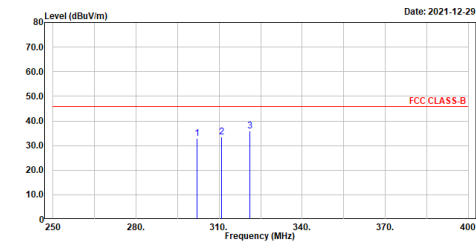


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB	
1	302.000	22.76	46.00	-23.24	33.90	-11.14	QP
2	311.000	26.48	46.00	-19.52	37.30	-10.82	QP
3	321.000	27.86	46.00	-18.14	38.30	-10.44	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Highspeed_Fundamental_Z
TEST BY :Johnny

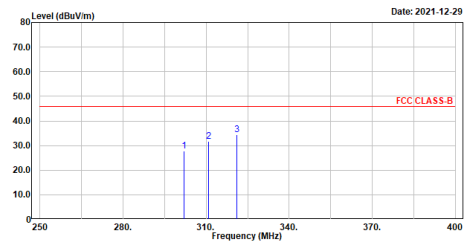


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB	
1	302.000	32.76	46.00	-13.24	43.90	-11.14	QP
2	311.000	33.58	46.00	-12.42	44.40	-10.82	QP
3	321.000	35.86	46.00	-10.14	46.30	-10.44	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,Vertical
Mode :TX_Highspeed_Fundamental_Z
TEST BY :Johnny

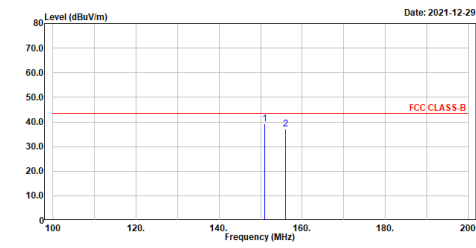


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	Limit	Level	dB	
1	302.000	27.66	46.00	-18.34	38.80	-11.14	QP
2	311.000	31.58	46.00	-14.42	42.40	-10.82	QP
3	321.000	34.46	46.00	-11.54	44.90	-10.44	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

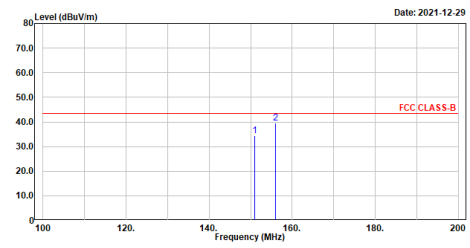
Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Lowspeed_Fundamental_X
TEST BY :Johnny



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	151.050	39.36	43.50	-4.14	51.02	-11.66	QP
2	155.950	37.07	43.50	-6.43	48.70	-11.63	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

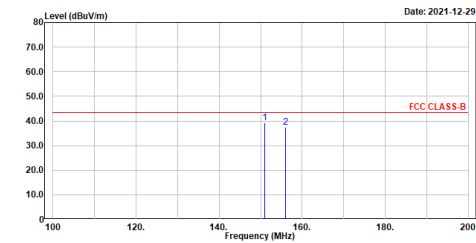
Site :966-1
Condition :3m ,Vertical
Mode :TX_Lowspeed_Fundamental_X
TEST BY :Johnny



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	151.050	34.34	43.50	-9.16	46.00	-11.66	QP
2	155.950	39.60	43.50	-3.90	51.23	-11.63	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

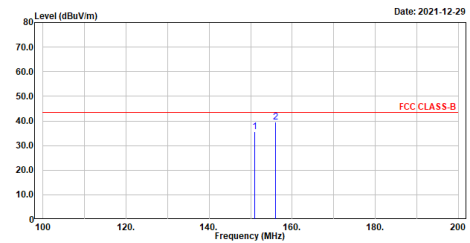
Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Lowspeed_Fundamental_Y
TEST BY :Johnny



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	151.050	39.14	43.50	-4.36	50.80	-11.66	QP
2	155.950	37.57	43.50	-5.93	49.20	-11.63	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

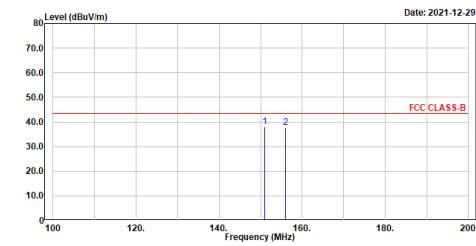
Site :966-1
Condition :3m ,Vertical
Mode :TX_Lowspeed_Fundamental_Y
TEST BY :Johnny



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	151.050	35.74	43.50	-7.76	47.40	-11.66	QP
2	155.950	39.57	43.50	-3.93	51.20	-11.63	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

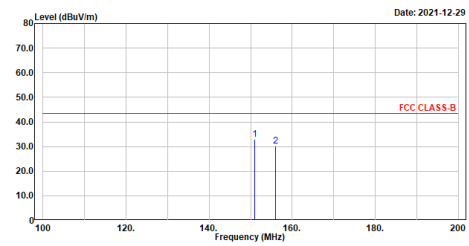
Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Lowspeed_Fundamental_Z
TEST BY :Johnny



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	151.050	38.14	43.50	-5.36	49.80	-11.66	QP
2	155.950	37.87	43.50	-5.63	49.50	-11.63	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

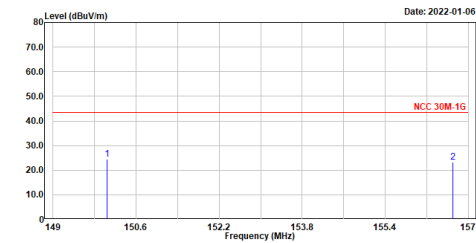
Site :966-1
Condition :3m ,Vertical
Mode :TX_Lowspeed_Fundamental_Z
TEST BY :Johnny



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	151.050	33.04	43.50	-10.46	44.70	-11.66	QP
2	155.950	30.07	43.50	-13.43	41.70	-11.63	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

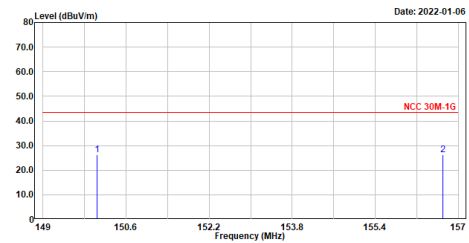
Site :966-1
Condition :3m ,Horizontal
Mode :TX_FSK_151.050MHz
TEST BY :Ashton Chiu



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	150.050	24.60	43.50	-18.90	36.45	-11.85	QP
2	156.700	23.12	43.50	-20.38	34.68	-11.56	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,Vertical
Mode :TX_FSK_151.050MHz
TEST BY :Ashton Chiu



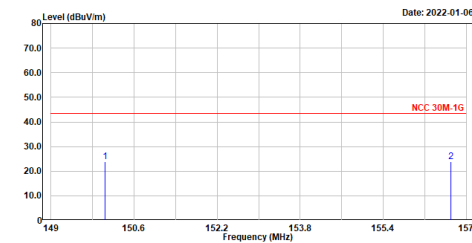
No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	150.050	26.18	43.50	-17.32	38.03	-11.85	QP
2	156.700	26.25	43.50	-17.25	37.81	-11.56	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,Horizontal
Mode :TX_FSK_155.95MHz
TEST BY :Ashton Chiu

Site :966-1
Condition :3m ,Vertical
Mode :TX_FSK_155.95MHz
TEST BY :Ashton Chiu

Date: 2022-01-06



Level (dBuV/m)

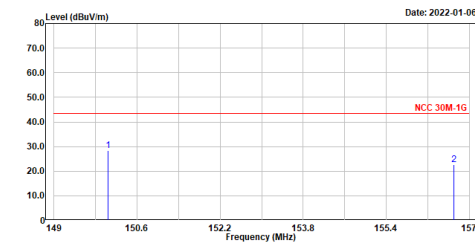
Frequency (MHz)

NCC 30M-1G

No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	150.050	23.76	43.50	-19.74	35.61	-11.85	QP
2	156.700	23.91	43.50	-19.59	35.47	-11.56	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Date: 2022-01-06



Level (dBuV/m)

Frequency (MHz)

NCC 30M-1G

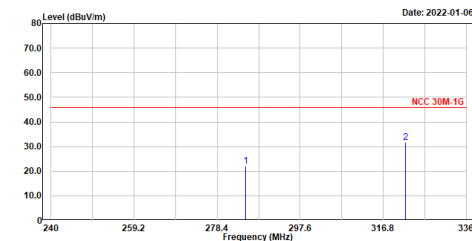
No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	150.050	28.36	43.50	-15.14	40.21	-11.85	QP
2	156.700	22.66	43.50	-20.84	34.22	-11.56	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,Horizontal
Mode :TX_Highspeed_302MHz
TEST BY :Ashton Chiu

Site :966-1
Condition :3m ,Vertical
Mode :TX_Highspeed_302MHz
TEST BY :Ashton Chiu

Date: 2022-01-06



Level (dBuV/m)

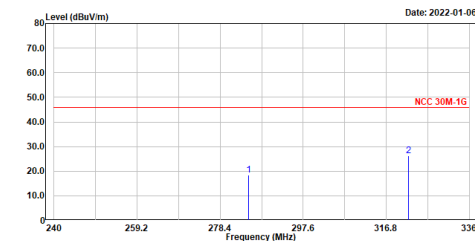
Frequency (MHz)

NCC 30M-1G

No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	285.000	22.06	46.00	-23.94	33.59	-11.53	QP
2	322.000	31.63	46.00	-14.37	42.05	-10.42	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Date: 2022-01-06



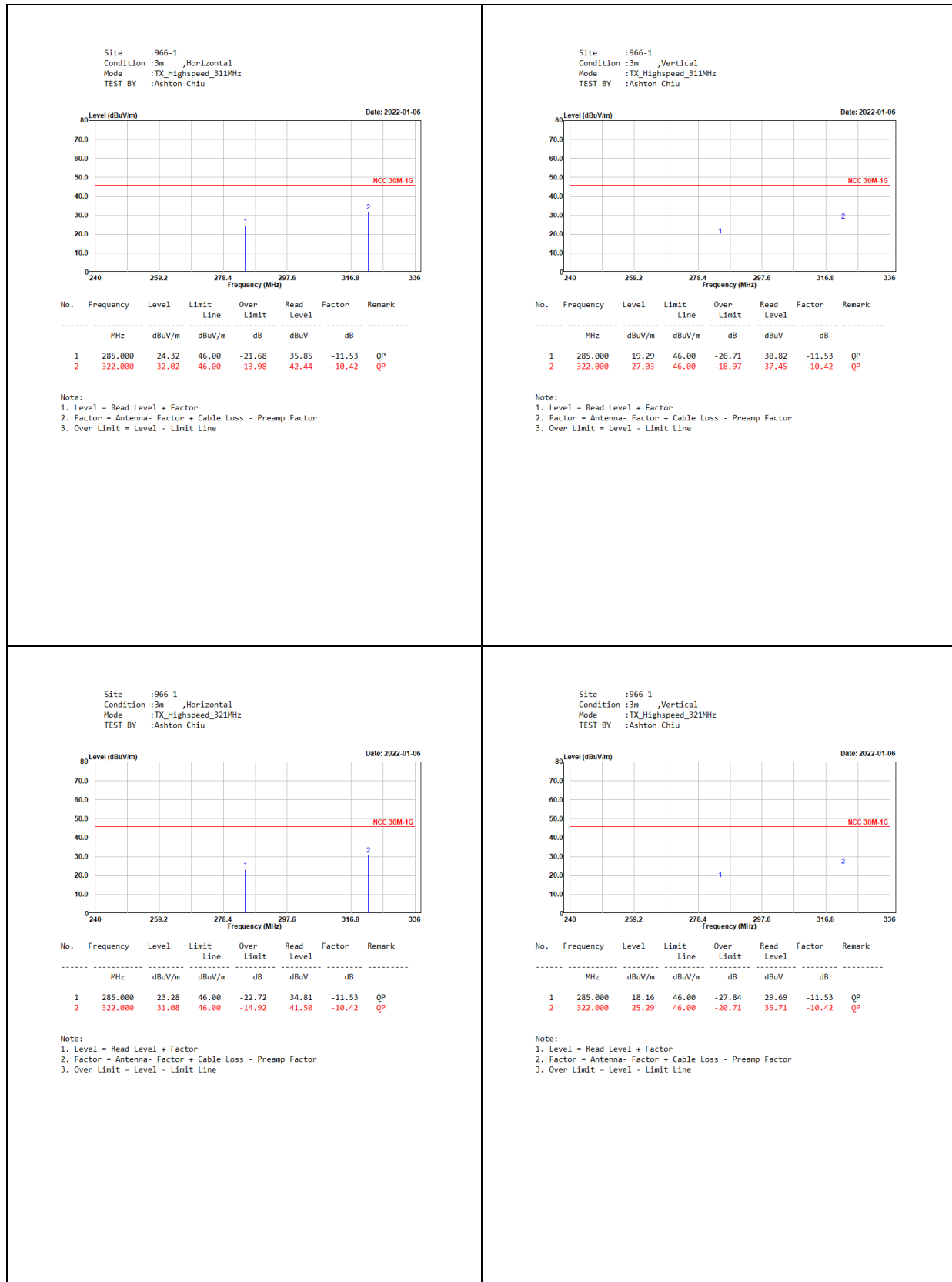
Level (dBuV/m)

Frequency (MHz)

NCC 30M-1G

No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	285.000	18.53	46.00	-27.47	30.06	-11.53	QP
2	322.000	26.18	46.00	-19.82	36.60	-10.42	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line



Site :966-1
Condition :3m ,Horizontal
Mode :TX_Lowspeed_151.05MHz
TEST BY :Ashton Chiu

Site :966-1
Condition :3m ,Vertical
Mode :TX_Lowspeed_151.05MHz
TEST BY :Ashton Chiu

Date: 2022-01-06

The plot shows a frequency range from 149 to 157 MHz. The y-axis represents Level in dBuV/m, ranging from 0 to 80. A horizontal red line at 43.50 dBuV/m is labeled 'NCC 30M-1G'. Two blue vertical lines represent the measured signals: one at 150.050 MHz (labeled '1') and another at 156.700 MHz (labeled '2').

No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	150.050	26.25	43.50	-17.25	38.10	-11.85	QP
2	156.700	25.01	43.50	-18.49	36.57	-11.56	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Date: 2022-01-06

The plot shows a frequency range from 149 to 157 MHz. The y-axis represents Level in dBuV/m, ranging from 0 to 80. A horizontal red line at 43.50 dBuV/m is labeled 'NCC 30M-1G'. Two blue vertical lines represent the measured signals: one at 150.050 MHz (labeled '1') and another at 156.700 MHz (labeled '2').

No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	150.050	28.34	43.50	-15.16	40.19	-11.85	QP
2	156.700	26.28	43.50	-17.22	37.84	-11.56	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1

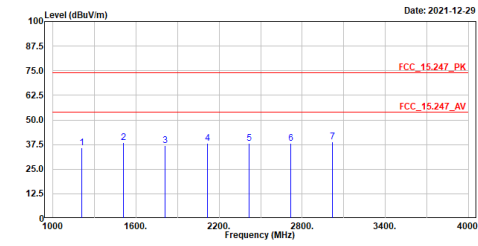
Condition :3m ,HORIZONTAL

Mode :TX_FSK_151.05MHZ

TEST BY :Caster

<

Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Highspeed_302MHz
TEST BY :Caster

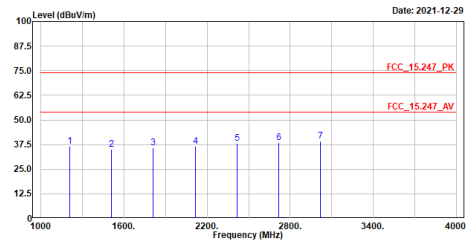


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	1208.000	35.96	74.00	-38.04	47.40	-11.44	Peak
2	1510.000	38.42	74.00	-35.58	50.51	-12.09	Peak
3	1812.000	37.09	74.00	-36.91	46.46	-9.37	Peak
4	2114.000	38.01	74.00	-35.99	45.70	-7.69	Peak
5	2416.000	37.94	74.00	-36.06	44.81	-6.87	Peak
6	2718.000	38.14	74.00	-35.86	44.56	-6.42	Peak
7	3020.000	38.69	74.00	-35.31	44.51	-5.82	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,VERTICAL
Mode :TX_Highspeed_302MHz
TEST BY :Caster

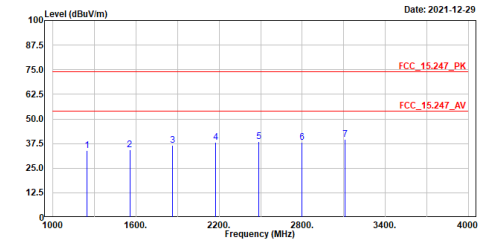


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	1208.000	36.58	74.00	-37.42	48.02	-11.44	Peak
2	1510.000	35.19	74.00	-38.81	47.28	-12.09	Peak
3	1812.000	35.68	74.00	-38.32	45.05	-9.37	Peak
4	2114.000	36.66	74.00	-37.34	44.35	-7.69	Peak
5	2416.000	38.30	74.00	-35.70	45.17	-6.87	Peak
6	2718.000	38.52	74.00	-35.48	44.94	-6.42	Peak
7	3020.000	39.36	74.00	-34.64	45.18	-5.82	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Highspeed_311MHz
TEST BY :Caster

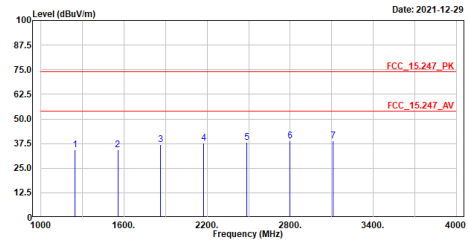


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	1244.000	34.05	74.00	-39.95	45.46	-11.41	Peak
2	1555.000	34.30	74.00	-39.70	46.08	-11.78	Peak
3	1866.000	36.79	74.00	-37.21	45.49	-8.70	Peak
4	2177.000	37.99	74.00	-36.01	45.74	-7.75	Peak
5	2488.000	38.66	74.00	-35.34	45.55	-6.89	Peak
6	2799.000	38.17	74.00	-35.83	44.45	-6.28	Peak
7	3110.000	39.60	74.00	-34.40	45.22	-5.62	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,VERTICAL
Mode :TX_Highspeed_311MHz
TEST BY :Caster

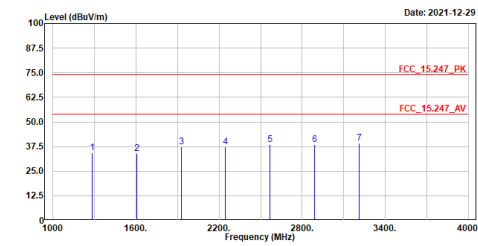


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	1244.000	34.22	74.00	-39.78	45.63	-11.41	Peak
2	1555.000	34.35	74.00	-39.65	46.13	-11.78	Peak
3	1866.000	36.82	74.00	-37.18	45.52	-8.70	Peak
4	2177.000	37.87	74.00	-36.13	45.62	-7.75	Peak
5	2488.000	38.13	74.00	-35.87	45.02	-6.89	Peak
6	2799.000	38.91	74.00	-35.09	45.19	-6.28	Peak
7	3110.000	38.74	74.00	-35.26	44.36	-5.62	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Highspeed_321MHZ
TEST BY :Caster

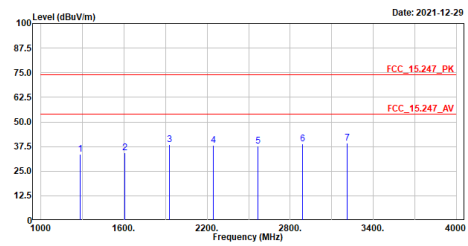


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	1284.000	34.34	74.00	-39.66	45.80	-11.46	Peak
2	1605.000	33.82	74.00	-40.18	45.16	-11.34	Peak
3	1926.000	37.54	74.00	-36.46	45.80	-8.26	Peak
4	2247.000	37.32	74.00	-36.68	44.86	-7.54	Peak
5	2568.000	38.33	74.00	-35.67	45.11	-6.78	Peak
6	2889.000	38.36	74.00	-35.62	44.61	-6.23	Peak
7	3210.000	39.21	74.00	-34.79	44.68	-5.47	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,VERTICAL
Mode :TX_Highspeed_321MHZ
TEST BY :Caster

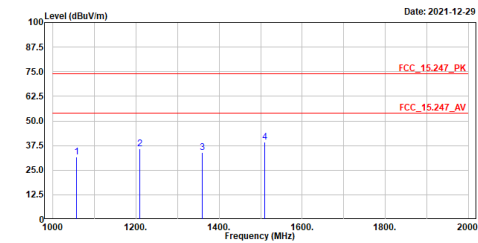


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	1284.000	33.41	74.00	-40.59	44.87	-11.46	Peak
2	1605.000	34.42	74.00	-39.58	45.76	-11.34	Peak
3	1926.000	38.35	74.00	-35.65	46.61	-8.26	Peak
4	2247.000	37.93	74.00	-36.07	45.47	-7.54	Peak
5	2568.000	37.64	74.00	-36.36	44.42	-6.78	Peak
6	2889.000	38.97	74.00	-35.03	45.20	-6.23	Peak
7	3210.000	39.10	74.00	-34.90	44.57	-5.47	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Lowspeed_151.05MHZ
TEST BY :Caster

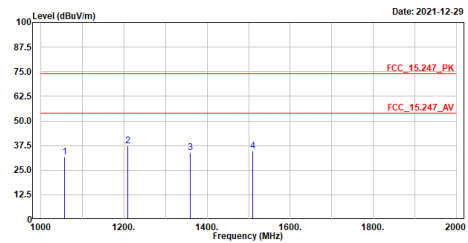


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	1057.350	31.73	74.00	-42.27	44.24	-12.51	Peak
2	1208.400	35.99	74.00	-38.01	47.43	-11.44	Peak
3	1359.450	33.81	74.00	-40.19	45.48	-11.67	Peak
4	1510.500	39.40	74.00	-34.60	51.49	-12.09	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,VERTICAL
Mode :TX_Lowspeed_151.05MHZ
TEST BY :Caster

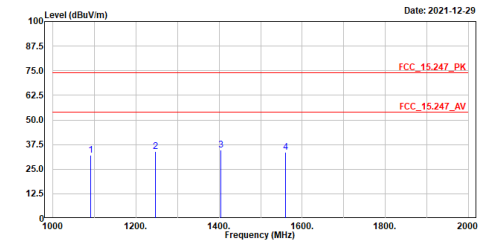


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	1057.350	31.88	74.00	-42.12	44.39	-12.51	Peak
2	1208.400	37.33	74.00	-36.67	48.77	-11.44	Peak
3	1359.450	33.90	74.00	-40.10	45.57	-11.67	Peak
4	1510.500	34.74	74.00	-39.26	46.83	-12.09	Peak

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

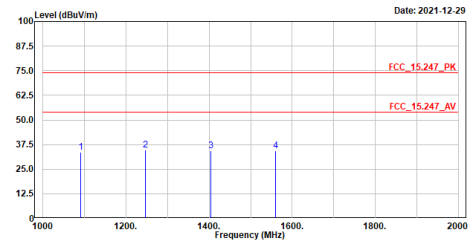
Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Lowspeed_155.95MHz
TEST BY :Caster



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	1091.650	31.93	74.00	-42.07	44.61	-12.68	Peak
2	1247.600	33.98	74.00	-40.02	45.39	-11.41	Peak
3	1403.550	34.60	74.00	-39.40	46.38	-11.78	Peak
4	1559.500	33.76	74.00	-40.24	45.58	-11.74	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

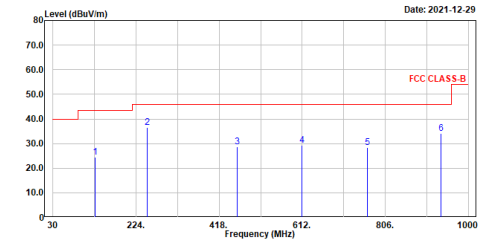
Site :966-1
Condition :3m ,VERTICAL
Mode :TX_Lowspeed_155.95MHz
TEST BY :Caster



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	1091.650	33.47	74.00	-40.53	46.15	-12.68	Peak
2	1247.600	34.55	74.00	-39.45	45.96	-11.41	Peak
3	1403.550	34.43	74.00	-39.57	46.21	-11.78	Peak
4	1559.500	34.47	74.00	-39.53	46.21	-11.74	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

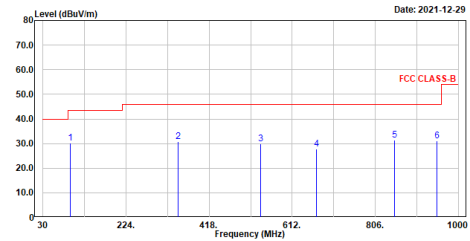
Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_FSK_151.05MHz
TEST BY :Bob Chiu



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	128.940	24.47	43.50	-19.03	37.40	-12.93	QP
2	250.190	36.43	46.00	-9.57	49.25	-12.82	QP
3	459.710	28.75	46.00	-17.25	35.97	-7.22	QP
4	612.000	29.31	46.00	-16.69	33.73	-4.42	QP
5	764.290	28.28	46.00	-17.72	30.39	-2.11	QP
6	935.980	34.03	46.00	-11.97	34.41	-0.38	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

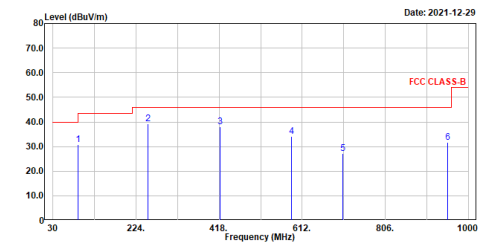
Site :966-1
Condition :3m ,VERTICAL
Mode :TX_FSK_151.05MHz
TEST BY :Bob Chiu



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level		
			dBuV/m	dB	dBuV	dB	
1	94.020	30.21	43.50	-13.29	47.61	-17.40	QP
2	346.220	30.83	46.00	-15.17	40.96	-10.13	QP
3	538.280	29.87	46.00	-16.13	35.88	-6.01	QP
4	668.260	27.64	46.00	-18.36	31.20	-3.56	QP
5	850.620	31.40	46.00	-14.60	32.72	-1.32	QP
6	950.530	31.21	46.00	-14.79	31.36	-0.15	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Highspeed_311MHz
TEST BY :Caster

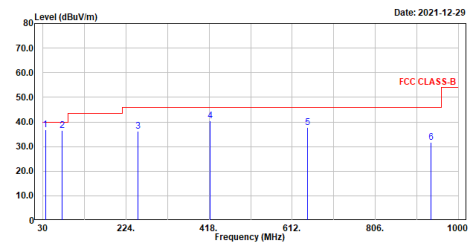


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	89.170	30.68	43.50	-12.82	48.52	-17.84	QP
2	252.130	39.30	46.00	-6.70	52.07	-12.77	QP
3	419.940	37.92	46.00	-8.08	46.45	-8.53	QP
4	587.750	34.21	46.00	-11.79	38.90	-4.69	QP
5	707.060	27.13	46.00	-18.87	30.08	-2.95	QP
6	952.470	31.77	46.00	-14.23	31.88	-0.11	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,VERTICAL
Mode :TX_Highspeed_311MHz
TEST BY :Caster

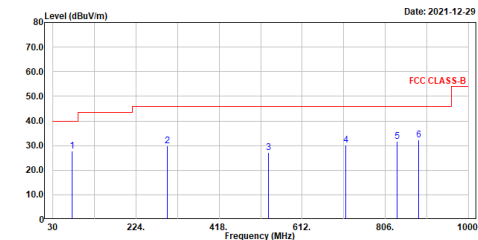


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	35.820	36.85	40.00	-3.15	49.62	-12.77	QP
2	74.620	36.50	40.00	-3.50	51.74	-15.24	QP
3	252.130	36.22	46.00	-9.78	48.99	-12.77	QP
4	419.940	40.44	46.00	-5.56	48.97	-8.53	QP
5	647.890	37.72	46.00	-8.28	41.41	-3.69	QP
6	935.900	31.79	46.00	-14.21	32.17	-0.38	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,HORIZONTAL
Mode :TX_Lowspeed_151.05MHz
TEST BY :Bob Chiu

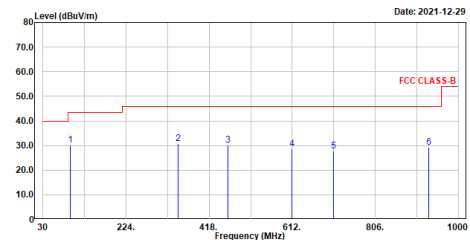


No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	74.620	27.64	40.00	-12.36	42.88	-15.24	QP
2	296.750	30.04	46.00	-15.96	41.30	-11.26	QP
3	532.460	27.26	46.00	-18.74	33.26	-6.00	QP
4	713.850	30.33	46.00	-15.67	33.27	-2.94	QP
5	834.130	31.65	46.00	-14.35	33.14	-1.49	QP
6	883.600	32.40	46.00	-13.60	33.49	-1.09	QP

Note:

1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

Site :966-1
Condition :3m ,VERTICAL
Mode :TX_Lowspeed_151.05MHz
TEST BY :Bob Chiu



No.	Frequency	Level	Limit	Over	Read	Factor	Remark
	MHz	dBuV/m	Line	Limit	Level	dB	
1	94.020	30.21	43.50	-13.29	47.61	-17.40	QP
2	346.220	30.83	46.00	-15.17	40.96	-10.13	QP
3	462.620	30.14	46.00	-15.86	37.31	-7.17	QP
4	612.000	28.58	46.00	-17.42	33.00	-4.42	QP
5	788.030	27.73	46.00	-18.27	30.67	-2.94	QP
6	931.130	29.39	46.00	-16.61	29.79	-0.40	QP

Note:

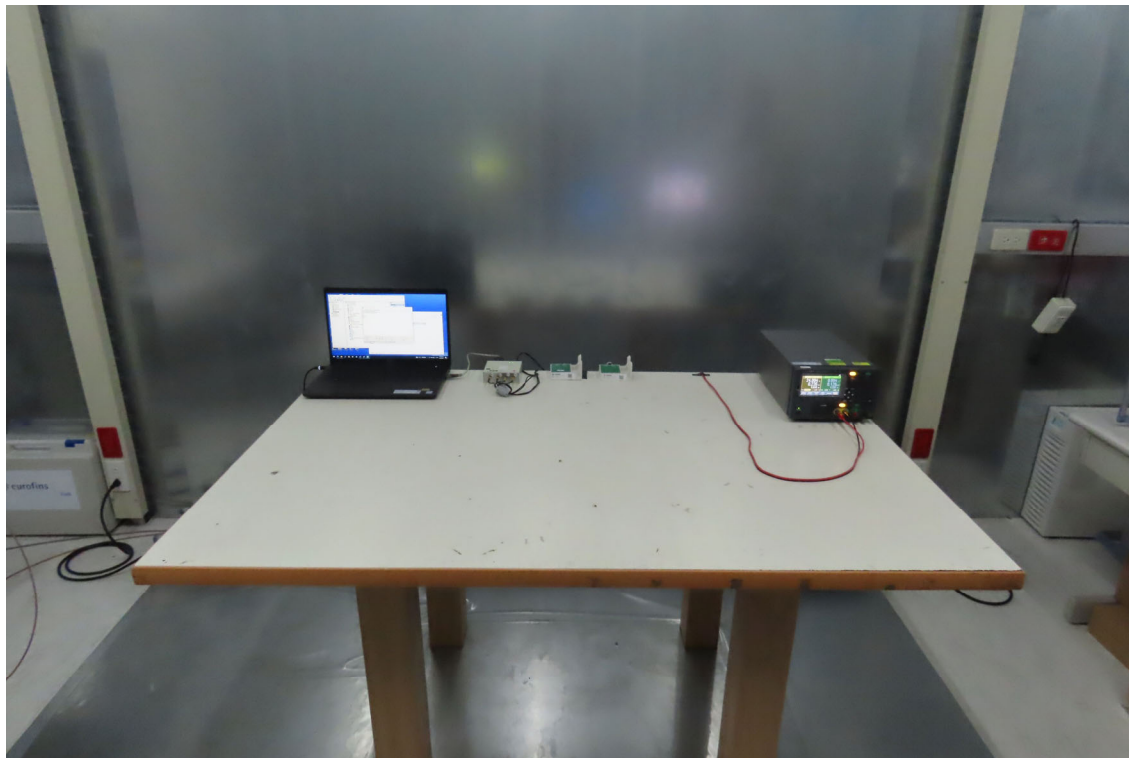
1. Level = Read Level + Factor
2. Factor = Antenna- Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line

4. EMI Reduction Method During Compliance Testing

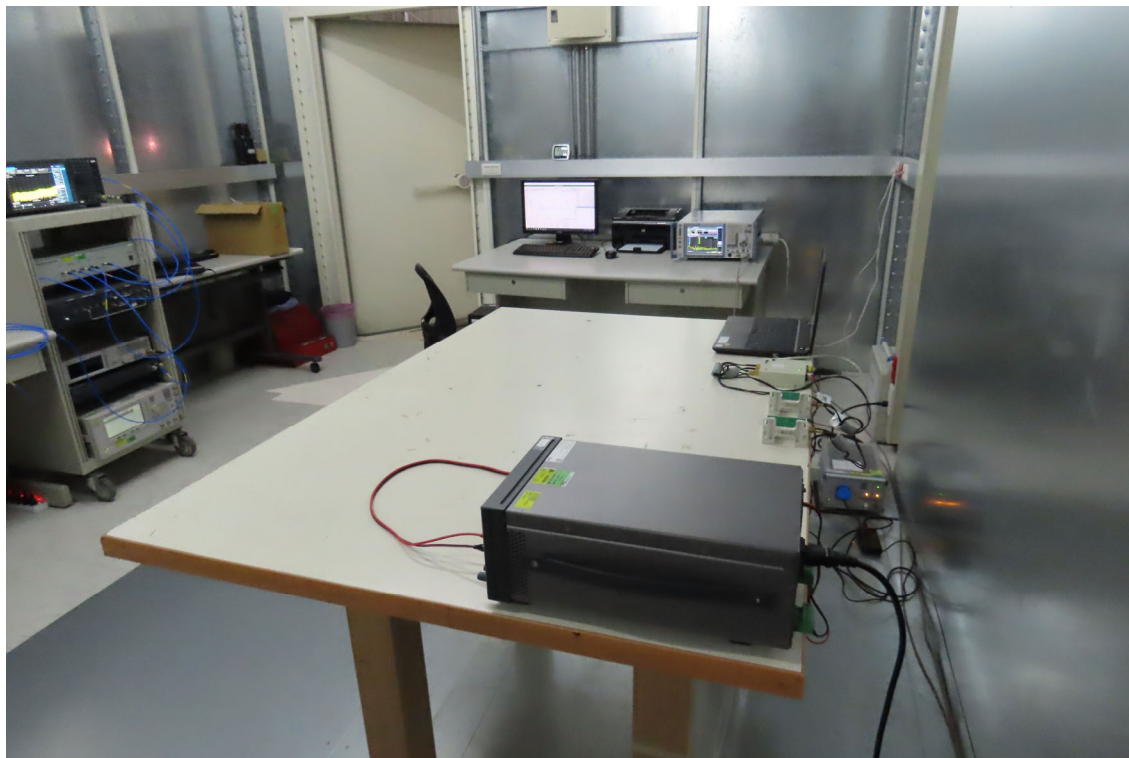
No modification was made during testing.

Appendix 1: EUT Test Setup Photographs

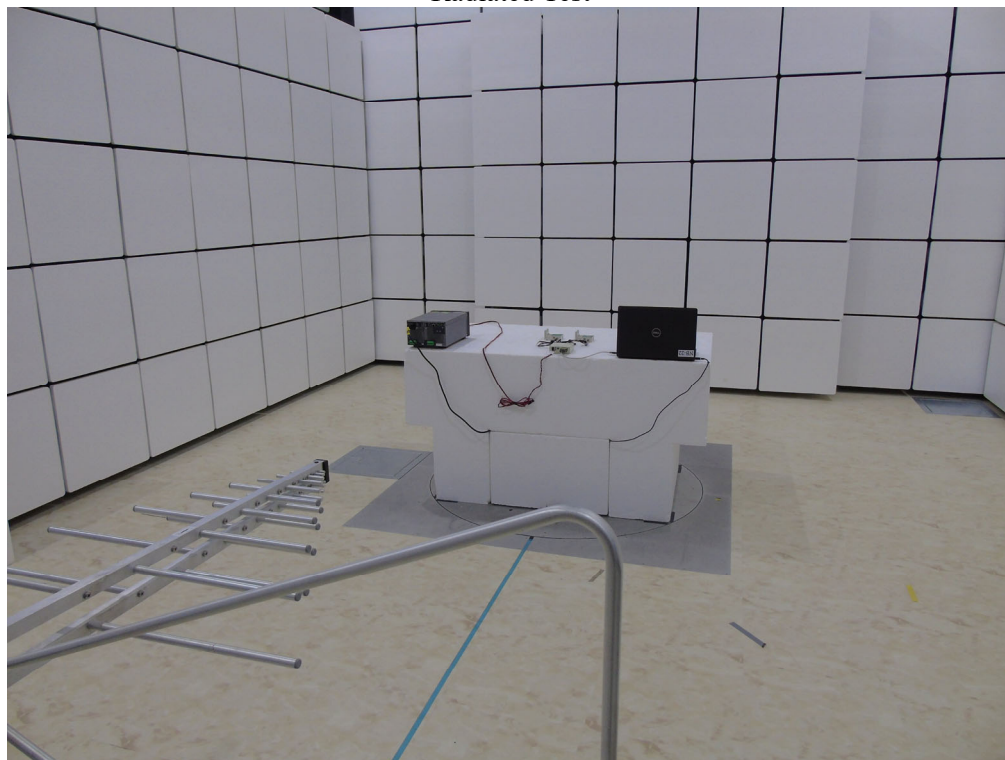
Front View of Conducted Test



Back View of Conducted Test



Radiated Test



Radiated Test (Horn)

