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检测
TESTING
CNAS L2264

RF TEST REPORT

Applicant ZTE CORPORATION
FCC ID SRQ-ZTU31
Product LTE/WCDMA/GSM (GPRS) Multi-Mode
Digital Mobile Phone
Brand ZTE
Model ZTU31/ZTE Blade V770/Blade V770
Report No. RXC1611-0258RF06R1
Issue Date January 19, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15C (2016)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Summary of Measurement Results

Number	Summary of measurements of results	Clause in FCC rules	Verdict
1	Peak Power Output -Conducted	15.247(b)(1)	PASS
2	Occupied Bandwidth (20dB)	15.247(a)(1)	PASS
3	Frequency Separation	15.247(a)(1)	PASS
4	Time of Occupancy (Dwell Time)	15.247(a)(1)(iii)	PASS
5	Band Edge Compliance	15.247(d)	PASS
6	Spurious Radiated Emissions in the restricted band	15.247(d),15.205,15.209	PASS
7	Number of Hopping Frequency	15.247(a)(1)(iii)	PASS
8	Spurious RF Conducted Emissions	15.247(d)	PASS
9	Radiates Emission	15.247(d),15.205,15.209	PASS
10	AC Power Line Conducted Emission	15.207	PASS
Date of Testing: November 18, 2016 ~ December 5, 2016			

1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by CNAS or any government agencies.

1.2 Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (recognition number is 428261)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
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City: Shanghai
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2 General Description of Equipment under Test

Client Information

Applicant	ZTE CORPORATION
Applicant address	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District Shenzhen, Guangdong, 518057, P.R. China
Manufacturer	ZTE CORPORATION
Manufacturer address	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District Shenzhen, Guangdong, 518057, P.R. China

General information

EUT Description			
Model Number:	ZTU31		
IMEI:	863682030001706		
HW Version:	uu9A		
SW Version:	KDDI_JP_BV770_V1.0		
Power Supply:	Battery/ AC adapter		
Antenna Type:	Internal Antenna		
Test Mode(s):	Basic Rate	Enhanced Data Rate(EDR)	
Modulation Type:	Frequency Hopping Spread Spectrum (FHSS)		
	GFSK	$\pi/4$ DQPSK	8DQPSK
Packet Type: (Maximum Payload)	DH5	2DH5	3DH5
Max. Conducted Power	9.48 dBm		
Tested Frequency Range(s):	2400 ~ 2483.5 MHz		
EUT Accessory			
Battery	Manufacturer: SCUD (Fujian) Electronics Co., Ltd Model: Li3925T44P8h786035		
USB Cable	100cm Cable, Shielded		
Note: 1. The information of the EUT is declared by the manufacturer. Please refer to the specifications or user manual for details.			



2.1 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards

- **FCC CFR47 Part 15C (2016) Radio Frequency Devices**
- **ANSI C63.10 (2013)**
- **DA00-705 Filing and Frequency Measurement Guidelines For Frequency Hopping Spread Spectrum System (2000).**

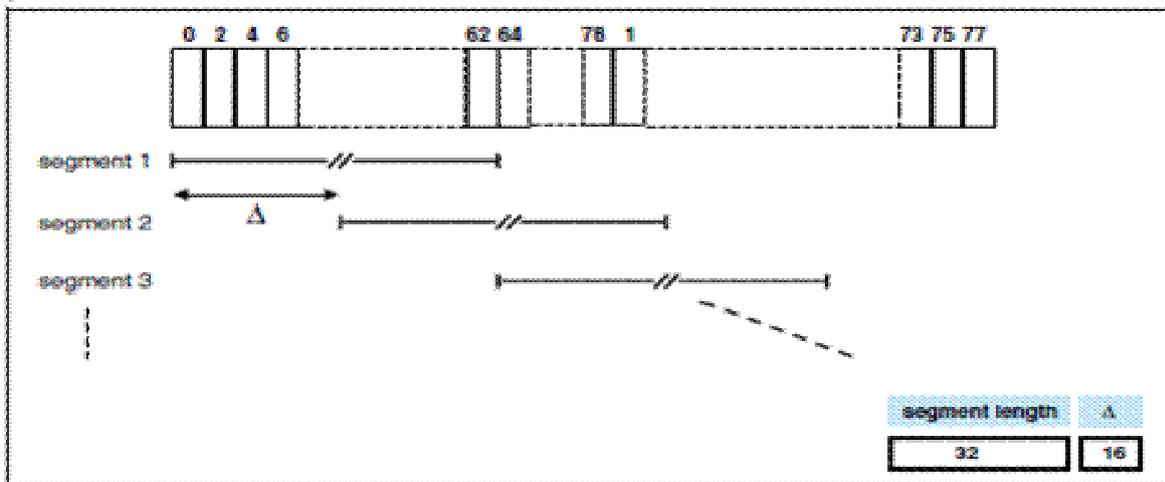
3 Information about the FHSS characteristics

3.1 Pseudorandom Frequency Hopping Sequence

Frequency Hopping Systems. A spread spectrum system in which the carrier is modulated with the coded information in a conventional manner causing a conventional spreading of the RF energy about the frequency carrier. The frequency of the carrier is not fixed but changes at fixed intervals under the direction of a coded sequence. The wide RF bandwidth needed by such a system is not required by spreading of the RF energy about the carrier but rather to accommodate the range of frequencies to which the carrier frequency can hop. The test of a frequency hopping system is that the near term distribution of hops appears random, the long term distribution appears evenly distributed over the hop set, and sequential hops are randomly distributed in both direction and magnitude of change in the hop set.

The selection scheme chooses a segment of 32 hop frequencies spanning about 64 MHz and visits these hops in a pseudo-random order. Next, a different 32-hop segment is chosen, etc. In the page, master page response, slave page response, page scan, inquiry, inquiry response and inquiry scan hopping sequences, the same 32-hop segment is used all the time (the segment is selected by the address; different devices will have different paging segments).

When the basic channel hopping sequence is selected, the output constitutes a pseudo-random sequence that slides through the 79 hops. The principle is depicted in the figure below.



Hop selection scheme in CONNECTION state.

Pseudorandom Frequency Hopping Sequence Table as below:

Channel: 08, 24, 40, 56, 40, 56, 72, 09, 01, 09, 33, 41, 33, 41, 65, 73, 53, 69, 06, 22, 04, 20, 36, 52, 38, 46, 70, 78, 68, 76, 21, 29, 10, 26, 42, 58, 44, 60, 76, 13, 03, 11, 35, 43, 37, 45, 69, 77, 55, 71, 08, 24, 08, 24, 40, 56, 40, 48, 72, 01, 72, 01, 25, 33, 12, 28, 44, 60, 42, 58, 74, 11, 05, 13, 37, 45, etc.

Each frequency used equally on the average by each transmitter.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

3.2 Equal Hopping Frequency Use

All Bluetooth units participating in the Pico net are time and hop-synchronized to the channel. Each new transmission event begins on the next channel in the hopping sequence after the final channel used in the previous transmission event.

3.3 System Receiver Input Bandwidth

Each channel bandwidth is 1MHz. The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

4 Test Information

4.1 Test Mode

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

Test Modes		
Band	Radiated Test Cases	Conducted Test Cases
BT	3DH5 8DQPSK (Channel 0/39/78)	DH5 GFSK(Channel 0/39/78) 2DH5 $\pi/4$ -DQPSK(Channel 0/39/78) 3DH5 8DQPSK(Channel 0/39/78)

Note: The maximum RF output power levels are 3DH5 for 8DQPSK modulation, For RSE and CSE, only the maximum RF output power is chosen.

4.2 Peak Power Output – Conducted

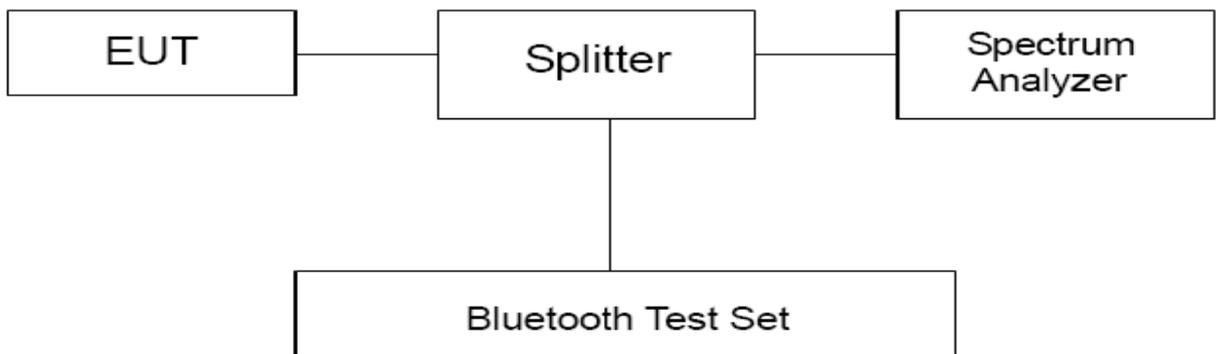
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The EUT is controlled by the Bluetooth test set to ensure max power transmission with proper modulation. The peak detector is used. RBW is set to 2 MHz; VBW is set to 6 MHz. These measurements have been tested at following channels: 0, 39, and 78.

Test Setup



Limits

Rule Part 15.247 (b) (1) specifies that " For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts."

Peak Output Power	≤ 0.125W (21dBm)
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U=0.44$ dB.

**Test Results**

Channel	Frequency (MHz)	Peak Output Power (dBm)			Conclusion
		DH5	2DH5	3DH5	
0	2402	8.57	9.41	9.48	PASS
39	2441	8.19	9.01	9.23	PASS
78	2480	8.14	8.97	9.18	PASS

Note: The measured power (dBm) has the offset with cable loss already.

4.3 Occupied Bandwidth (20dB)

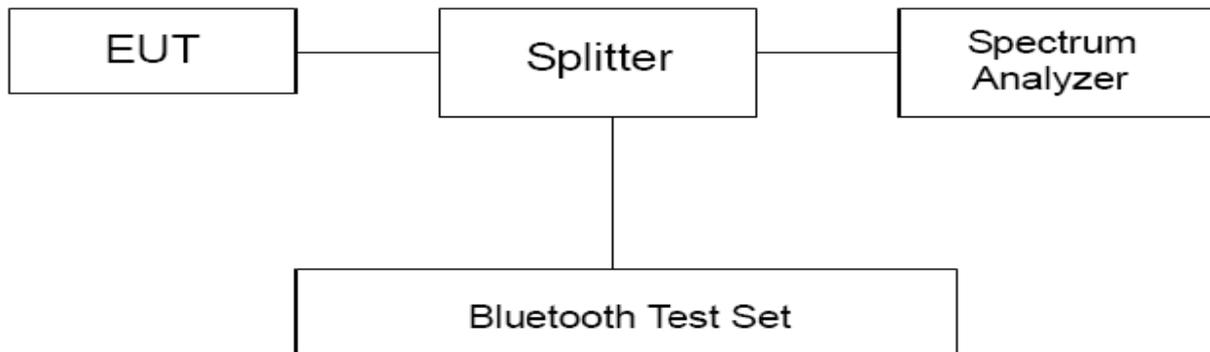
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 30kHz and VBW is set to 100kHz on spectrum analyzer. -20dB occupied bandwidths are recorded.

Test Setup



Limits

No specific occupied bandwidth requirements in part 15.247(a) (1).

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U=936$ Hz.

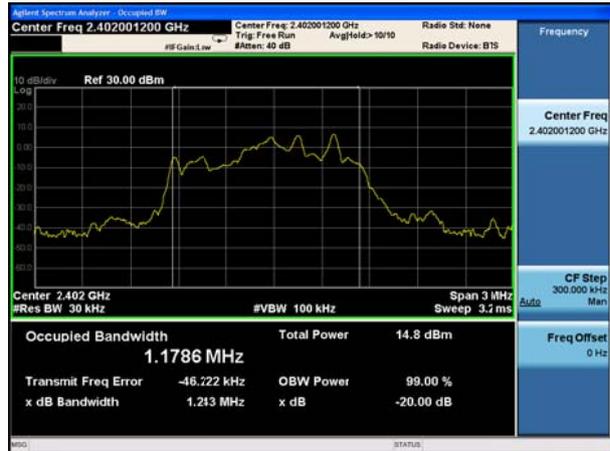
**Test Results**

Mode	Channel	Frequency (MHz)	20dB Bandwidth(kHz)	99% Bandwidth(kHz)
DH5	0	2402	1049	997.89
DH5	39	2441	1047	998.66
DH5	78	2480	1048	998.51
2DH5	0	2402	1243	1178.6
2DH5	39	2441	1243	1179.2
2DH5	78	2480	1243	1179.3
3DH5	0	2402	1184	1121.5
3DH5	39	2441	1174	1118.1
3DH5	78	2480	1176	1116.9

BT DH5 CH0, Carrier frequency (MHz): 2402



BT 2DH5 CH0, Carrier frequency (MHz): 2402



BT DH5 CH39, Carrier frequency (MHz): 2441



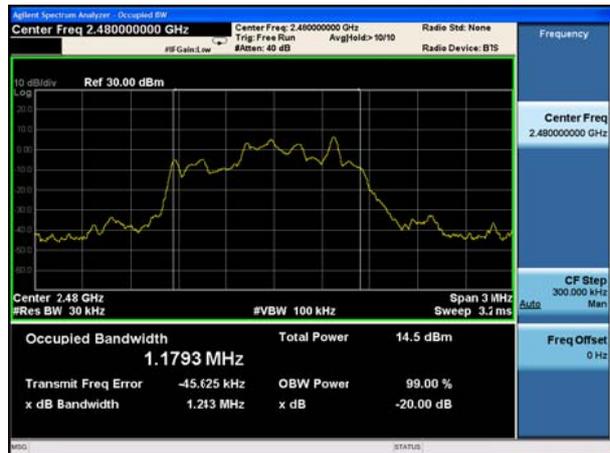
BT 2DH5 CH39, Carrier frequency (MHz): 2441

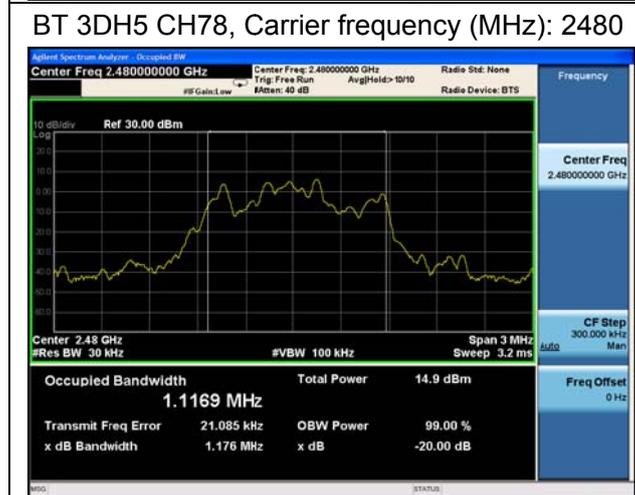
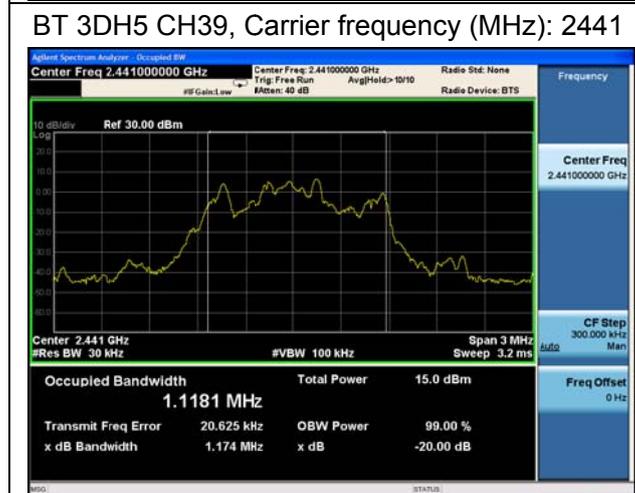
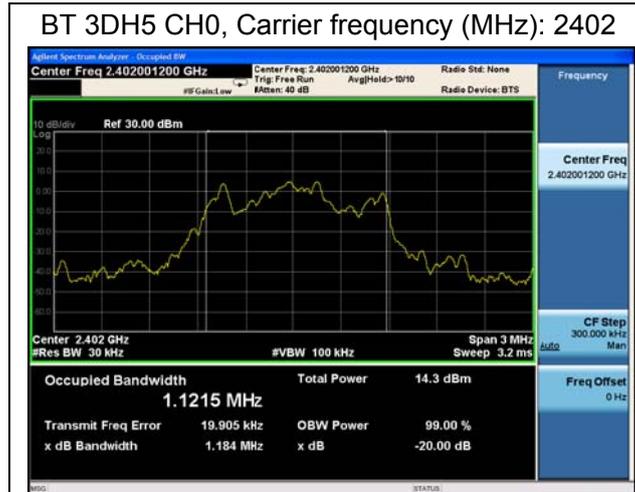


BT DH5 CH78, Carrier frequency (MHz): 2480



BT 2DH5 CH78, Carrier frequency (MHz): 2480





4.4 Frequency Separation

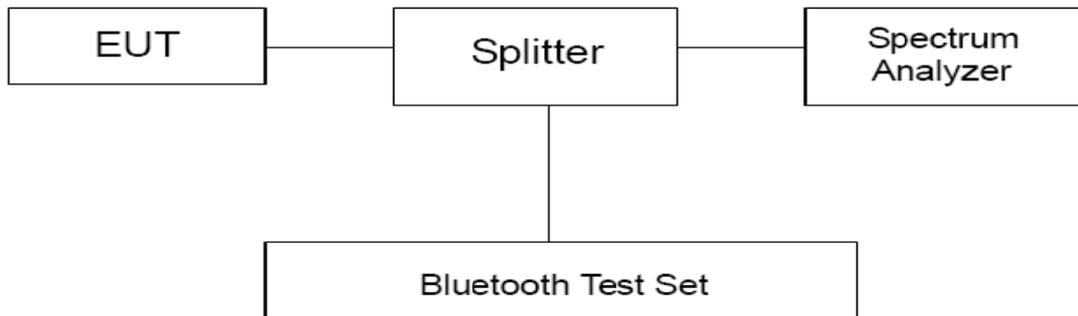
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 30 kHz and VBW is set to 100 kHz on spectrum analyzer. Set EUT on Hopping on mode.

Test setup



Limits

Rule Part 15.247(a)(1) specifies that “Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. ”

Note: The value of two-thirds of 20 dB bandwidth is always greater than 25 kHz.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U=936$ Hz.

Test Results:

Packet type	Carrier frequency (MHz)	Carrier frequency separation(kHz)	20dB Bandwidth(kHz)	Limit (kHz)	Conclusion
DH5	2441	1002	1002	668	PASS
2DH5	2441	999	1002	668	PASS
3DH5	2441	1002	1008	672	PASS

Note: The limit is two-thirds of 20 dB bandwidth.

BT DH5 CH39, Carrier frequency (MHz): 2441



BT 2DH5 CH39, Carrier frequency (MHz): 2441



BT 3DH5 CH39, Carrier frequency (MHz): 2441



4.5 Time of Occupancy (Dwell Time)

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

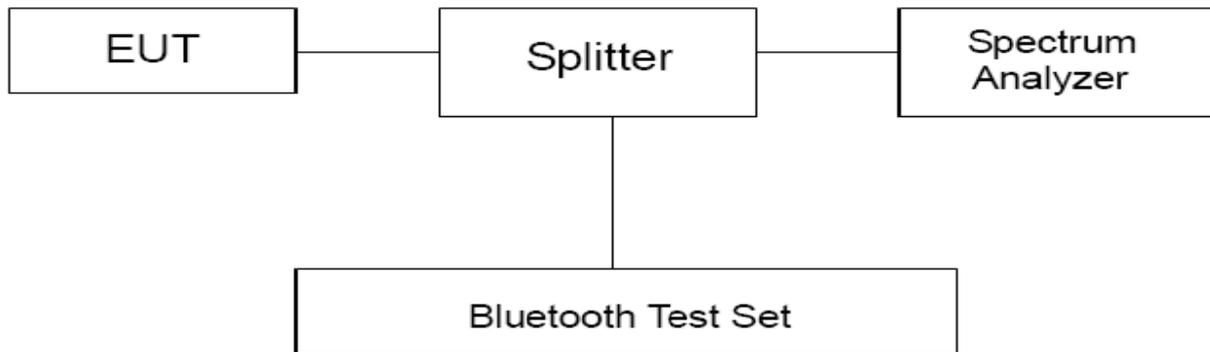
Methods of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 1MHz and VBW is set to 3MHz on spectrum analyzer .The time slot length is measured of three different packet types, which are available in the Bluetooth technology. Those are DH1, DH3 and DH5 packets. The dwell time is calculated by:

Dwell time = time slot length * hop rate * 0.4s with:

- hop rate=1600 * 1/s for DH1 packet =1600
- hop rate=1600/3 * 1/s for DH3 packet =533.33
- hop rate=1600/5 * 1/s for DH5 packet =320

Test Setup



Limits

Rule Part 22.913(a) specifies that " Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed."

Dwell time	≤ 400ms
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$.

Requirements	Uncertainty	
Dwell Time	DH1	$U=0.64\text{ms}$
	DH3	$U=0.80\text{ms}$
	DH5	$U=0.70\text{ms}$

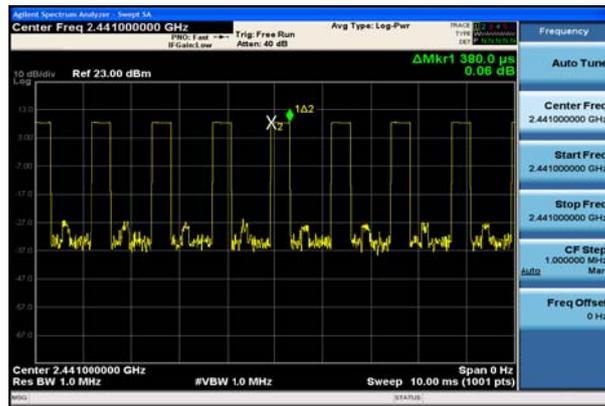


Test Results:

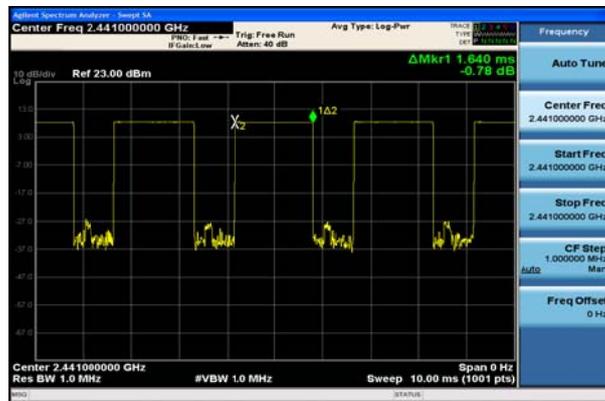
Channel 39					
Packet type	hop rate (1/s)	Time slot length(ms)	Dwell time (ms)	Limit (ms)	Conclusion
DH1	1600	0.38	243.20	400	PASS
DH3	533.33	1.64	349.86	400	PASS
DH5	320	2.89	369.92	400	PASS

Note: Dwell time = time slot length * hop rate * 0.4s

BT DH1 CH39, Carrier frequency (MHz): 2441



BT DH3 CH39, Carrier frequency (MHz): 2441



BT DH5 CH39, Carrier frequency (MHz): 2441



4.6 Band Edge Compliance

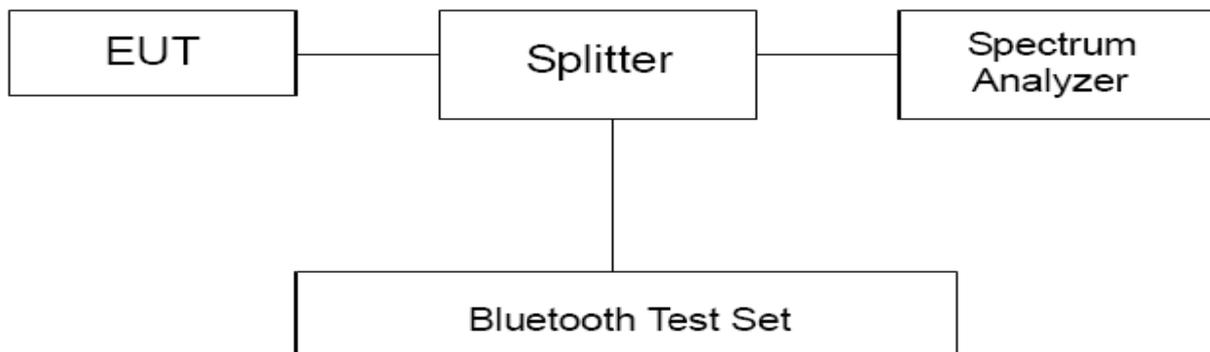
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The lowest and highest channels were measured. The peak detector is used. RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer. EUT test for Hopping On mode and Hopping Off mode.

Test Setup



Limits

Rule Part 15.247(d) specifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.”

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
2GHz-3GHz	1.407 dB

Test Results

Hopping On

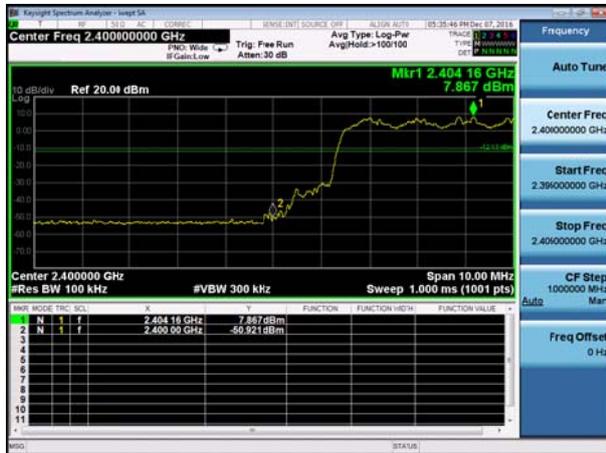
BT DH5 CH0, Carrier frequency (MHz): 2402



BT DH5 CH78, Carrier frequency (MHz): 2480



BT 2DH5 CH0, Carrier frequency (MHz): 2402



BT 2DH5 CH78, Carrier frequency (MHz): 2480



BT 3DH5 CH0, Carrier frequency (MHz): 2402

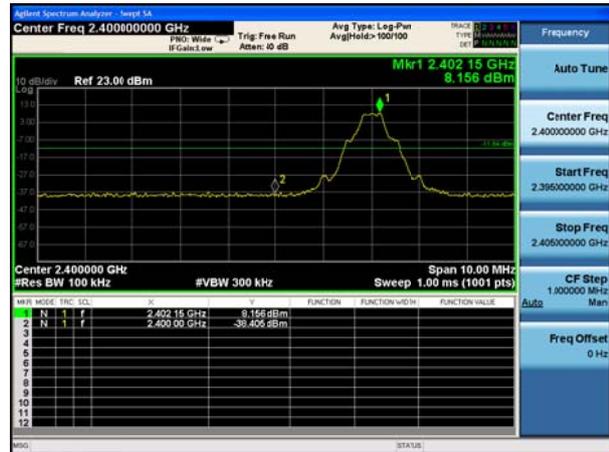


BT 3DH5 CH78, Carrier frequency (MHz): 2480



Hopping Off

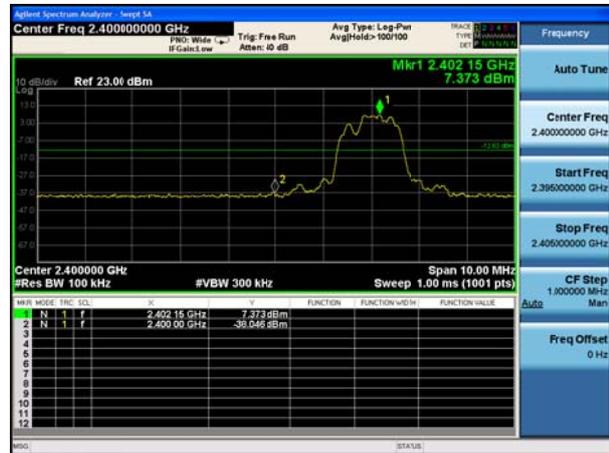
BT DH5 CH0, Carrier frequency (MHz): 2402



BT DH5 CH78, Carrier frequency (MHz): 2480



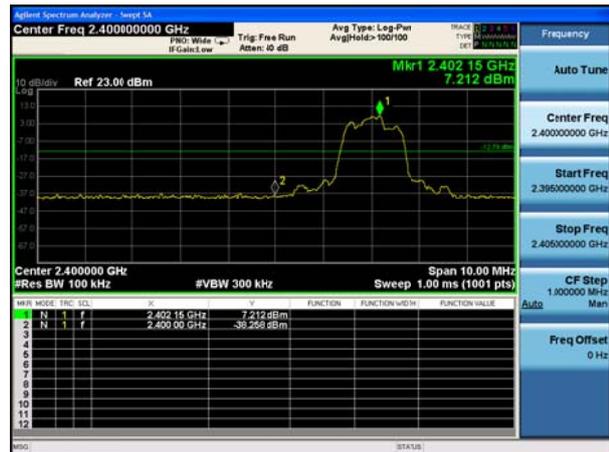
BT 2DH5 CH0, Carrier frequency (MHz): 2402



BT 2DH5 CH78, Carrier frequency (MHz): 2480



BT 3DH5 CH0, Carrier frequency (MHz): 2402



BT 3DH5 CH78, Carrier frequency (MHz): 2480



4.7 Spurious Radiated Emissions in the Restricted Band

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

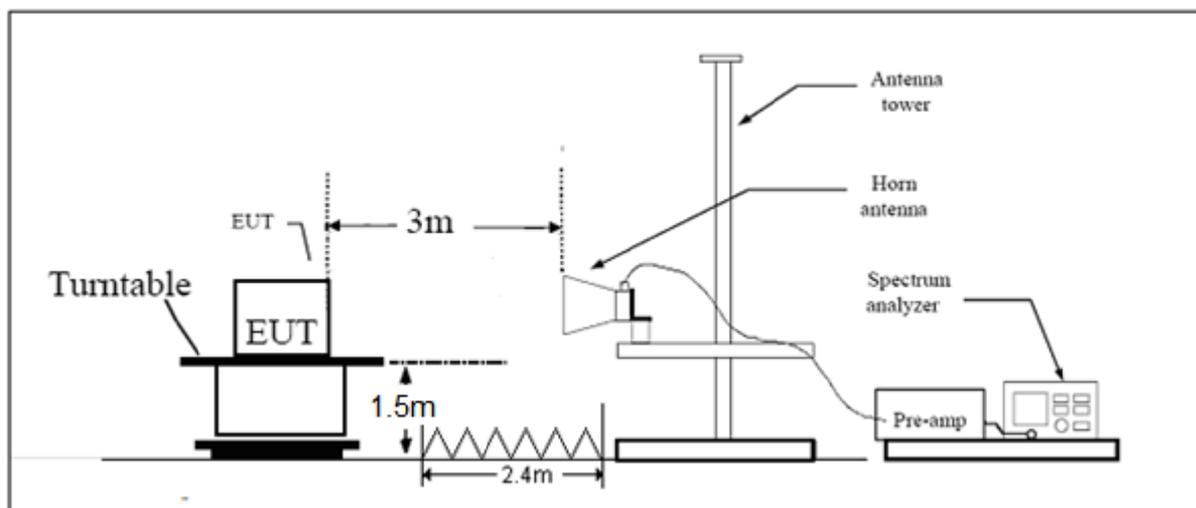
Set the spectrum analyzer in the following:

- (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
- (b) The dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak- average correction factor, derived from the appropriate duty cycle calculation.

This setting method can refer to **DA00-705**.

The test is in transmitting mode. The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis) and docking mode. The worst emission was found in stand-up position (Y axis) and the worst case was recorded.

Test setup



Note: Area side: 2.4mX3.6m

Limits

Spurious Radiated Emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

Limit in restricted band

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

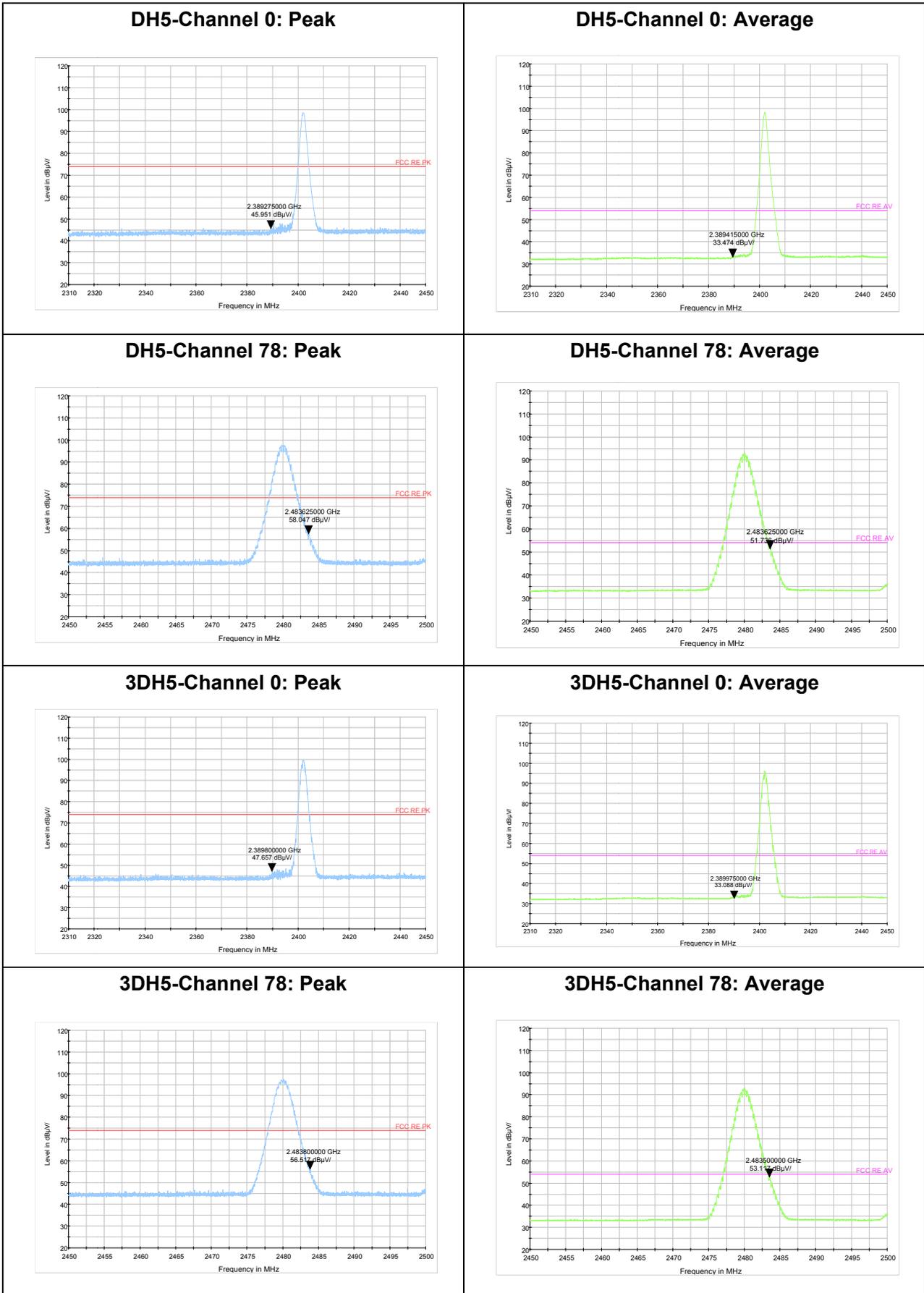
Peak Limit=74dBuV/m

Average Limit=54dBuV/m

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 3.55$ dB.

Test Results:



4.8 Number of hopping Frequency

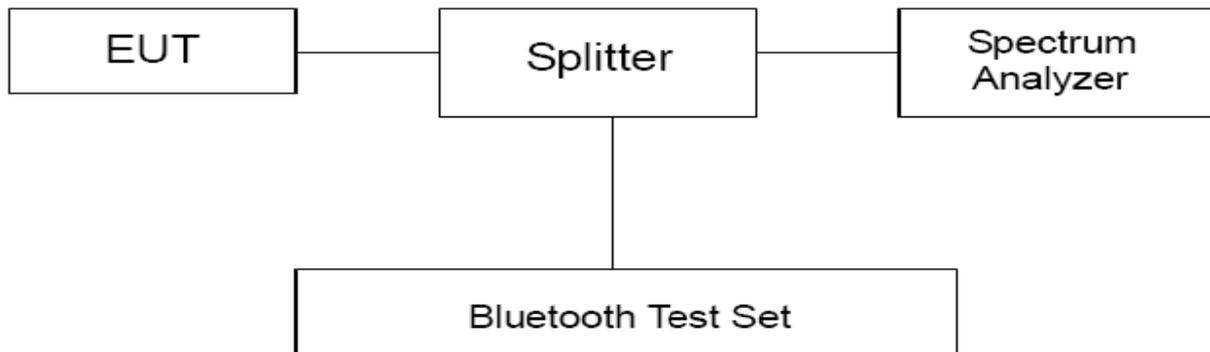
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 1MHz and VBW is set to 1 MHz on spectrum analyzer. Set EUT on Hopping on mode.

Test setup



Limits

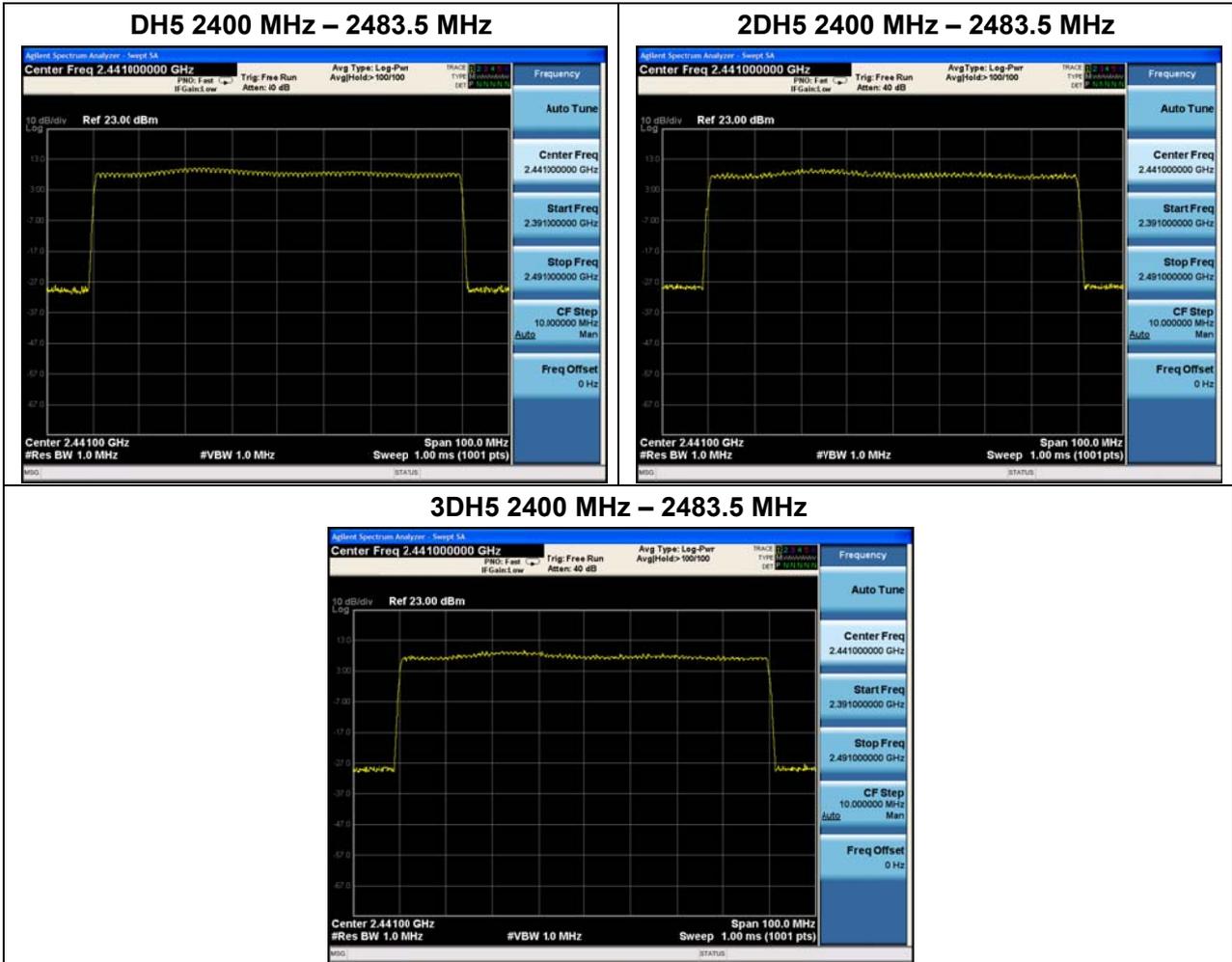
Rule Part 15.247(a) (1) (iii) specifies that” Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.”

Limits	≥ 15 channels
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Test Results:

	Number of hopping channels	conclusion
DH5	79	PASS
2DH5	79	PASS
3DH5	79	PASS



4.9 Spurious RF Conducted Emissions

Ambient condition

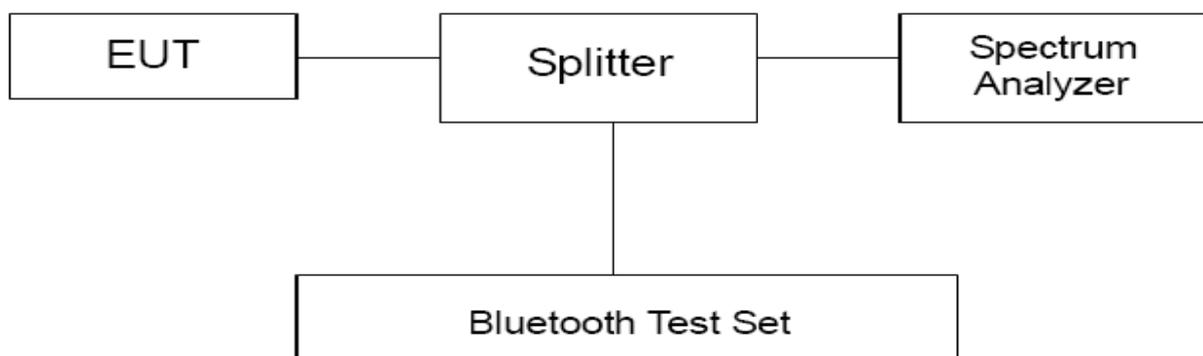
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. RBW and VBW are set to 100 kHz, Sweep is set to ATUO.

The test is in transmitting mode.

Test setup



Limits

Rule Part 15.247(d) pacifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.”

Mode	Carrier frequency (MHz)	Reference value (dBm)	Limit(dBm)
DH5	2402	7.55	-12.45
	2441	7.39	-12.61
	2480	7.93	-12.07
EDR (3DH5)	2402	5.43	-14.57
	2441	4.41	-15.59
	2480	3.81	-16.20



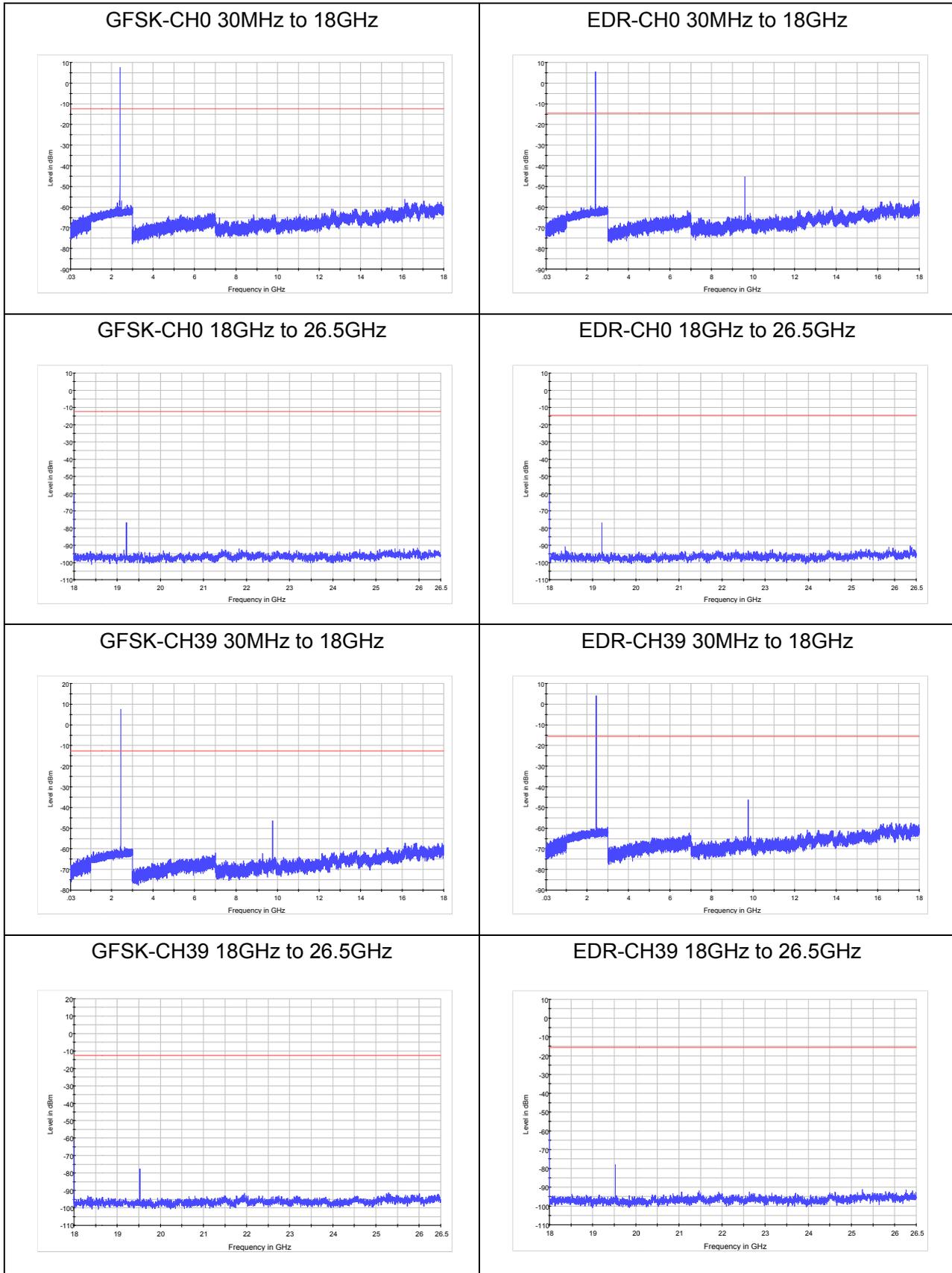
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-26GHz	1.407 dB

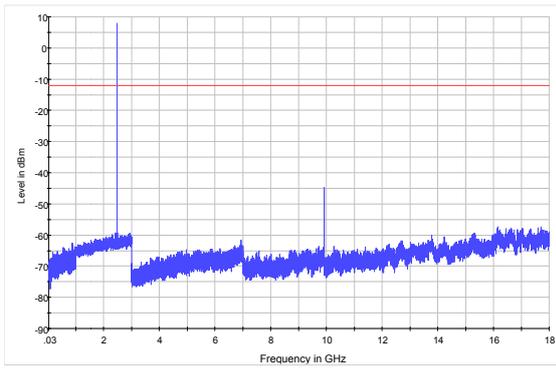


Test Results:

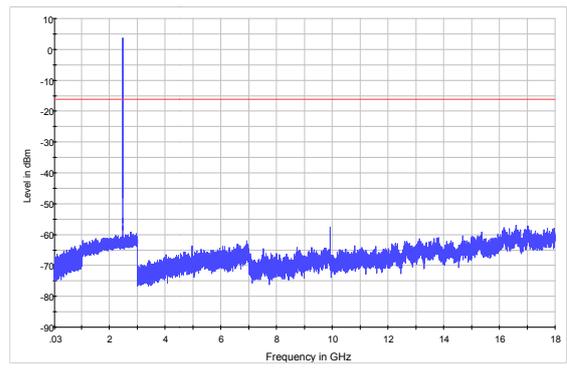




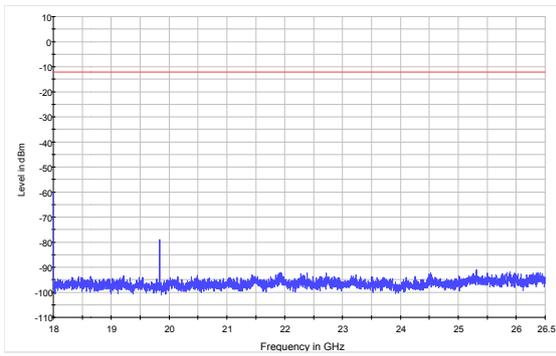
GFSK-CH78 30MHz to 18GHz



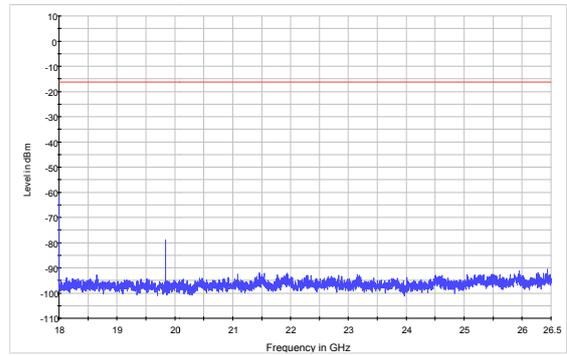
EDR-CH78 30MHz to 18GHz



GFSK-CH78 18GHz to 26.5GHz



EDR-CH78 18GHz to 26.5GHz



4.10 Radiates Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	102.5kPa

Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.10-2013. The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.

Sweep the whole frequency band through the range from 9 kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, below 30MHz, the center of the loop shall be 1 meters; above 30MHz, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Set the spectrum analyzer in the following:

Below 1GHz (detector: Peak and Quasi-Peak)

RBW= 100kHz/ VBW=300kHz / Sweep=AUTO

Above 1GHz (detector: Peak):

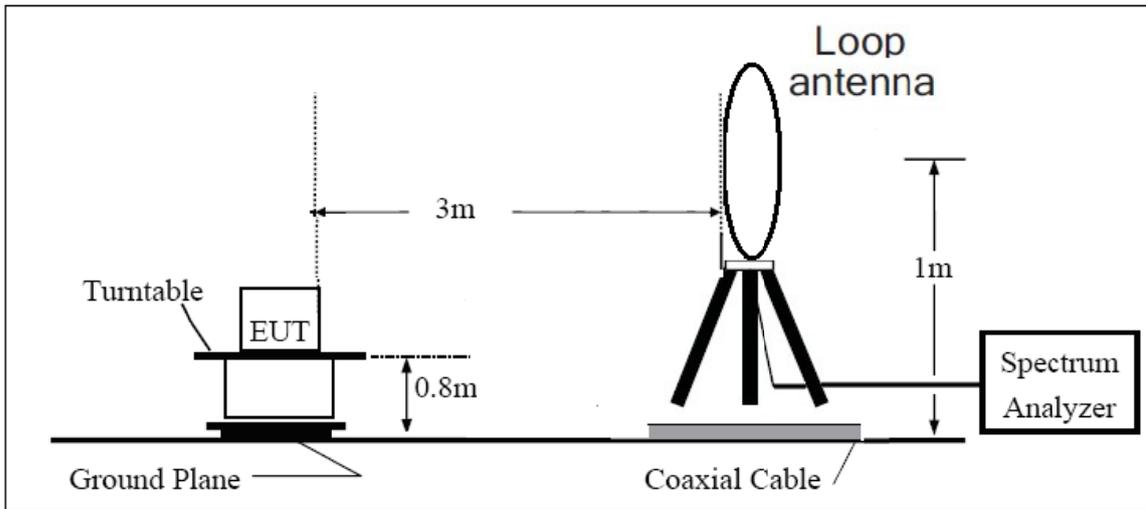
(a) PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

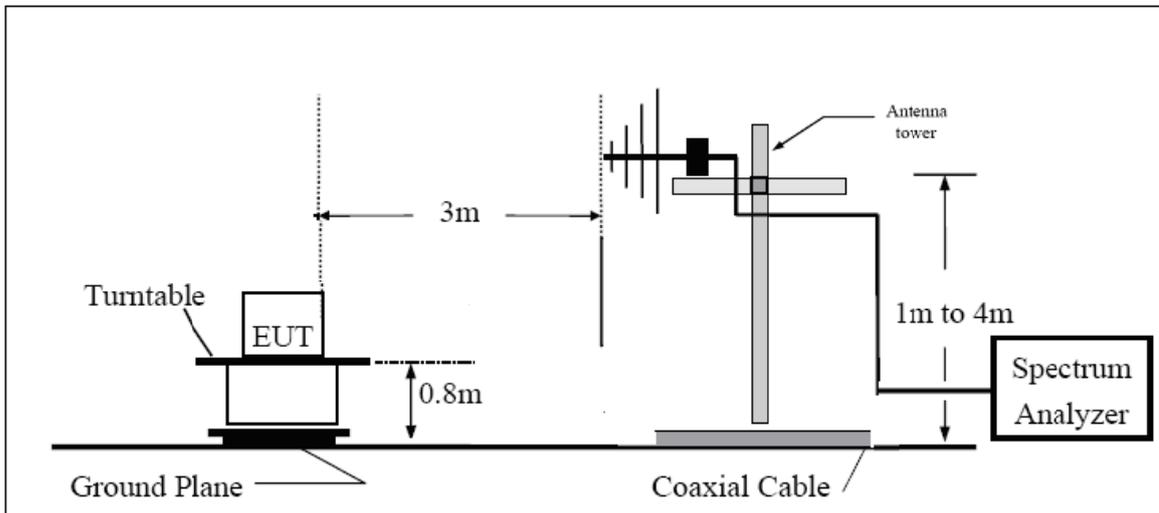
The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded. Then this mode was measured in the following mode: EUT with cradle and EUT without cradle. The worst emission was found in EUT with cradle mode and the worst case was recorded.

The test is in transmitting mode.

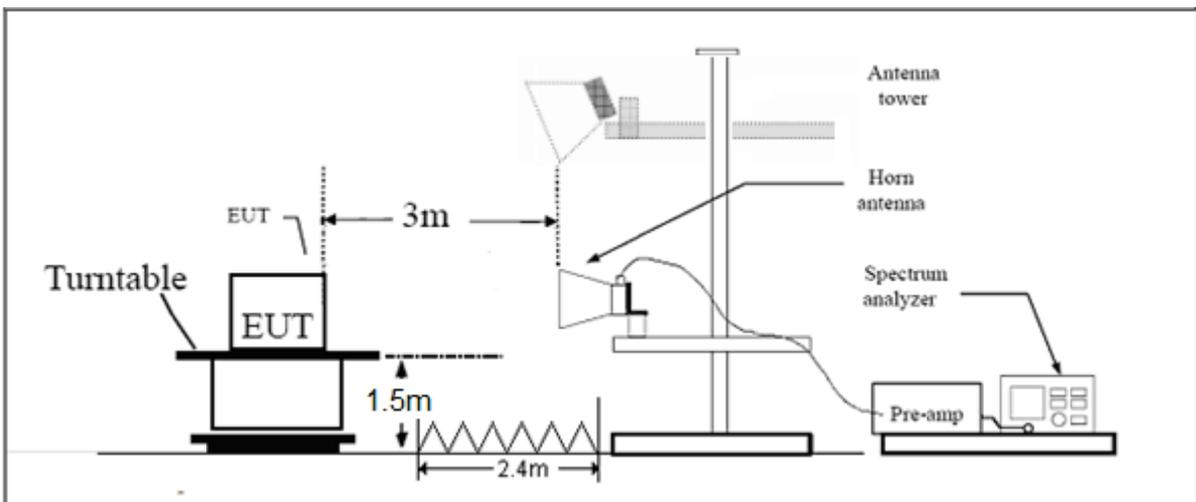
Test setup
9KHz~~~ 30MHz



30MHz~~~ 1GHz



Above 1GHz



Limits

Rule Part 15.247(d) specifies that “In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).”

Limit in restricted band

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009–0.490	2400/F(kHz)	/
0.490–1.705	24000/F(kHz)	/
1.705–30.0	30	/
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
9KHz-30MHz	3.55 dB
30MHz-200MHz	4.19 dB
200MHz-1GHz	3.63 dB
Above 1GHz	3.68 dB

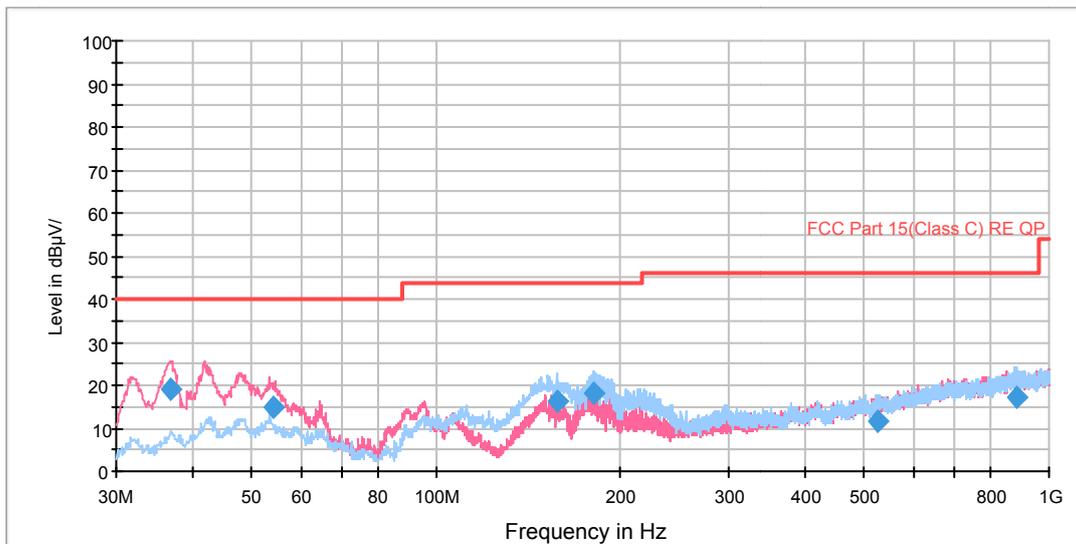
Test result

Sweep from 9 kHz to 30MHz, and the emissions more than 20 dB below the permissible value are not reported.

The following graphs display the maximum values of horizontal and vertical by software. For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

GFSK-Channel 0

RE 30M-1GHz QP

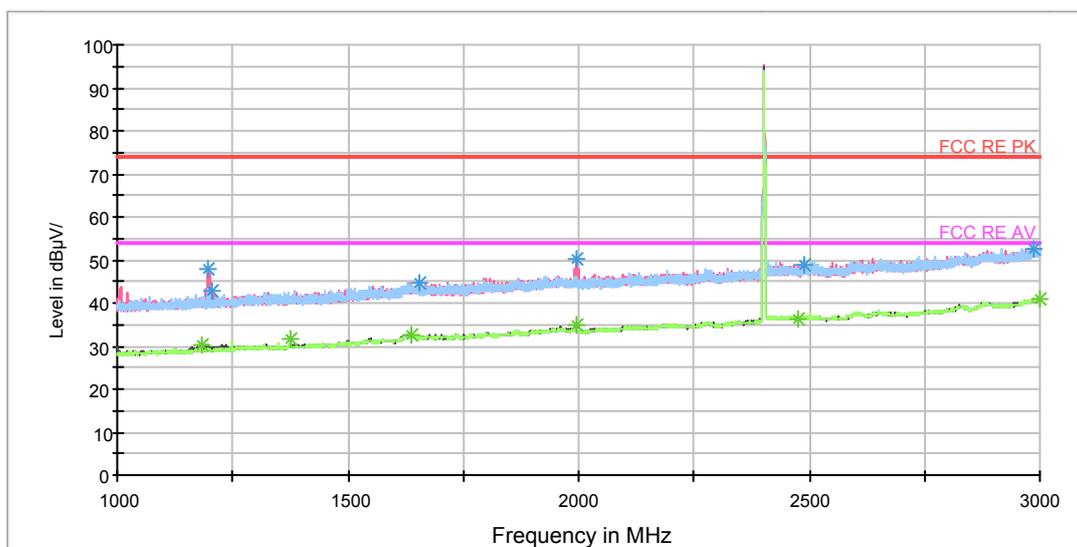


Radiates Emission from 30MHz to 1GHz

Note: This graph displays the maximum values of horizontal and vertical by software

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
36.737078	19.0	125.0	V	15.0	41.2	-22.2	21.0	40.0
54.356269	14.9	100.0	V	239.0	35.9	-21.0	25.1	40.0
157.277325	16.4	125.0	H	290.0	45.4	-29.0	27.1	43.5
180.381019	18.2	125.0	H	280.0	46.3	-28.1	25.3	43.5
524.553000	11.8	100.0	H	120.0	30.5	-18.7	34.2	46.0
887.267500	17.2	125.0	H	16.0	29.9	-12.7	28.8	46.0

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

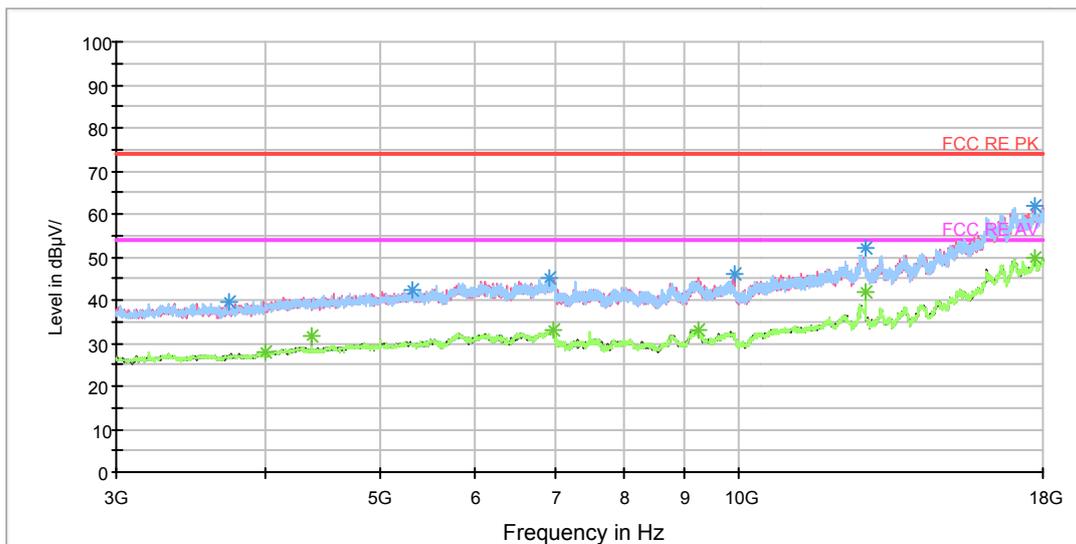
Note: The signal beyond the limit is carrier.

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1195.000000	47.8	102.0	V	237.0	56.0	-8.2	26.2	74
1204.000000	42.8	102.0	V	20.0	51.0	-8.2	31.2	74
1653.250000	44.8	202.0	H	285.0	49.9	-5.1	29.2	74
1995.000000	50.2	102.0	V	0.0	53.4	-3.2	23.8	74
2490.500000	48.8	102.0	V	167.0	49.1	0.3	25.2	74
2986.250000	52.8	102.0	V	306.0	55.0	2.2	21.2	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1183.250000	30.0	102.0	V	0.0	38.0	-8.0	24.0	54
1374.750000	31.5	102.0	H	31.0	38.6	-7.1	22.5	54
1638.750000	32.5	102.0	V	282.0	37.2	-4.7	21.5	54
1993.750000	34.8	102.0	V	352.0	38.1	-3.3	19.2	54
2476.750000	36.4	202.0	V	194.0	36.8	-0.4	17.6	54
2998.750000	40.9	102.0	V	143.0	43.2	2.3	13.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



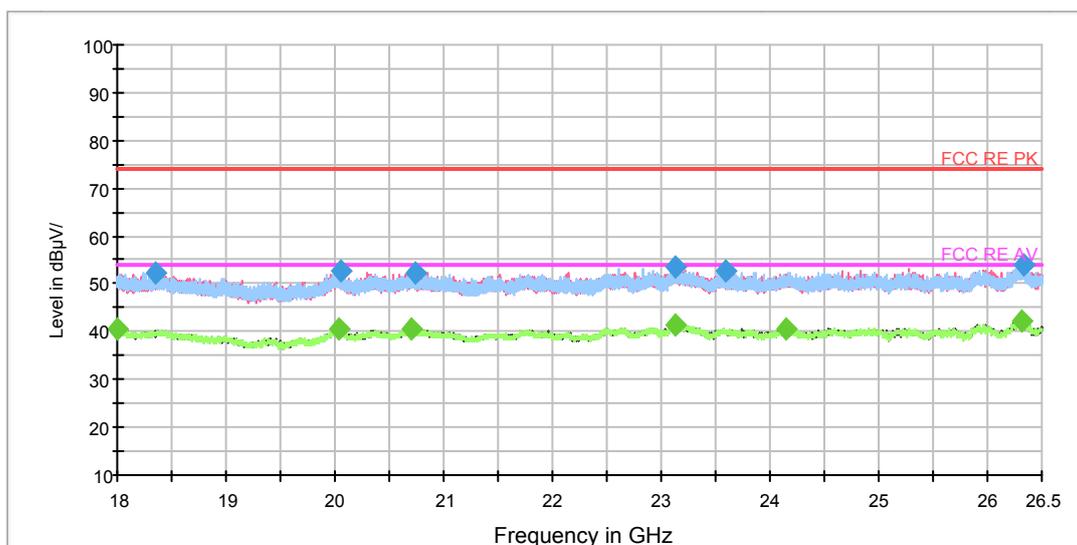
Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3725.625000	39.7	102.0	H	5.0	41.3	-1.6	34.3	74
5328.750000	42.5	102.0	H	59.0	44.8	2.3	31.5	74
6941.250000	45.0	102.0	V	0.0	51.1	6.1	29.0	74
9905.625000	45.8	102.0	V	0.0	56.1	10.3	28.2	74
12763.125000	51.9	102.0	H	0.0	65.8	13.9	22.1	74
17705.625000	61.7	102.0	H	32.0	86.4	24.7	12.3	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3999.375000	27.9	102.0	H	195.0	29.0	-1.1	26.1	54
4374.375000	31.4	102.0	V	247.0	31.8	0.4	22.6	54
6997.500000	33.1	102.0	H	0.0	39.6	6.5	20.9	54
9236.250000	32.8	102.0	H	0.0	42.7	9.9	21.2	54
12763.125000	41.8	102.0	H	0.0	55.7	13.9	12.2	54
17709.375000	49.6	102.0	H	5.0	74.3	24.7	4.4	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

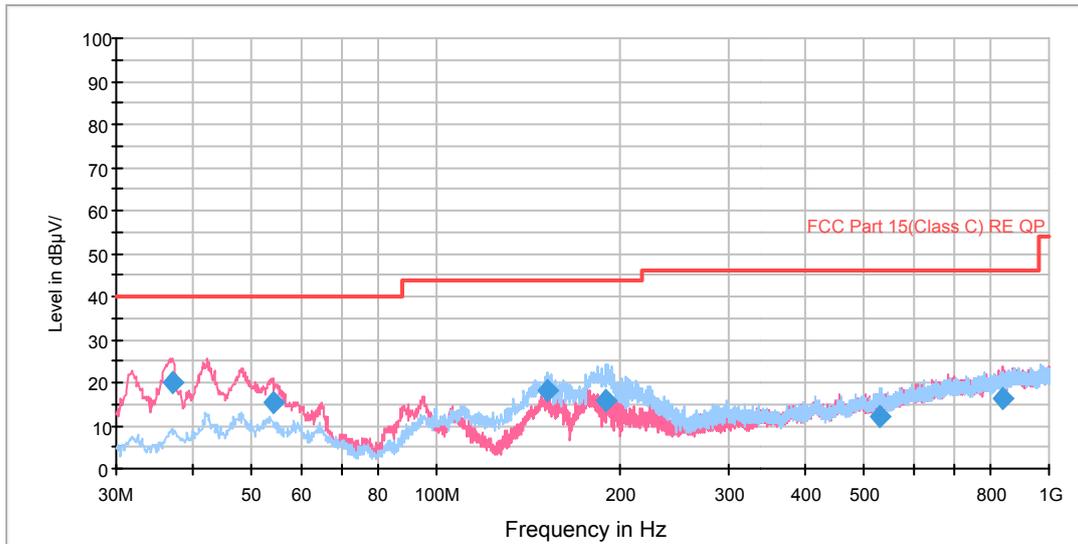
Frequency (MHz)	Peak (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18347.437500	52.3	H	0.0	55.6	-3.3	21.7	74
20047.437500	52.7	H	35.0	58.4	-5.7	21.3	74
20737.531250	52.3	V	0.0	59.1	-6.8	21.7	74
23121.781250	53.6	V	156.0	59.7	-6.1	20.4	74
23591.406250	52.9	H	118.0	58.8	-5.9	21.1	74
26331.062500	53.9	V	347.0	59.3	-5.4	20.1	74

Frequency (MHz)	Average (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18007.437500	40.4	V	263.0	42.2	-1.8	13.6	54
20035.750000	40.5	V	283.0	46.2	-5.7	13.5	54
20696.625000	40.5	H	98.0	47.2	-6.7	13.5	54
23129.218750	41.5	H	0.0	47.6	-6.1	12.5	54
24153.468750	40.7	H	204.0	46.6	-5.9	13.3	54
26320.437500	42.4	V	112.0	47.8	-5.4	11.6	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)



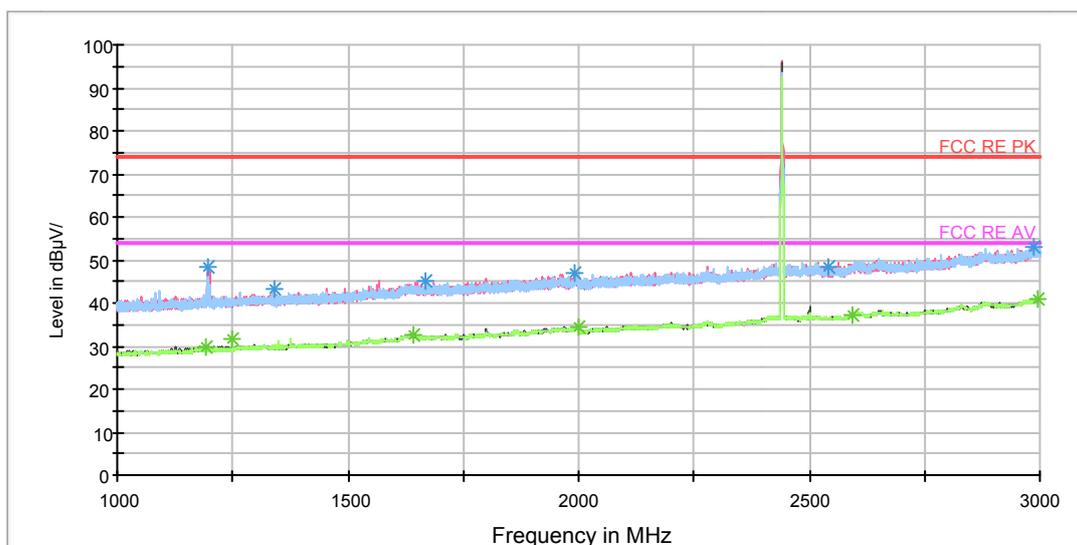
RE 30M-1GHz QP



Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
36.979919	20.0	100.0	V	341.0	42.1	-22.1	20.0	40.0
53.993428	15.3	100.0	V	265.0	36.2	-20.9	24.7	40.0
151.715662	18.0	125.0	H	279.0	47.2	-29.2	25.5	43.5
188.925406	15.8	125.0	H	247.0	43.1	-27.3	27.7	43.5
531.289750	12.1	100.0	H	16.0	30.4	-18.3	33.9	46.0
840.037000	16.4	125.0	V	141.0	29.9	-13.5	29.6	46.0

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

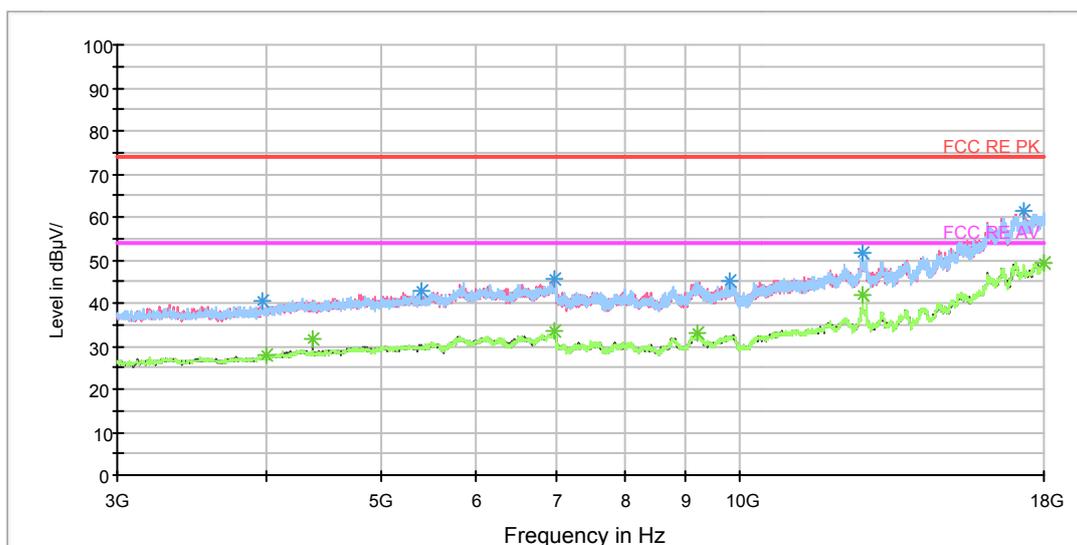
Note: The signal beyond the limit is carrier.

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1196.000000	48.4	102.0	V	0.0	56.6	-8.2	25.6	74
1339.500000	43.4	202.0	H	0.0	50.8	-7.4	30.6	74
1667.500000	45.3	202.0	V	0.0	50.4	-5.1	28.7	74
1992.250000	47.2	202.0	V	339.0	50.5	-3.3	26.8	74
2542.250000	48.3	102.0	H	240.0	48.7	-0.4	25.7	74
2987.500000	53.0	202.0	V	0.0	55.2	2.2	21.0	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1192.000000	29.9	102.0	V	0.0	38.1	-8.2	24.1	54
1250.000000	31.7	102.0	H	0.0	39.7	-8.0	22.3	54
1644.000000	32.5	202.0	H	0.0	37.3	-4.8	21.5	54
1999.500000	34.5	102.0	V	0.0	37.9	-3.4	19.5	54
2595.250000	37.4	202.0	V	52.0	37.6	0.2	16.6	54
2994.250000	40.9	202.0	V	0.0	43.2	2.3	13.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



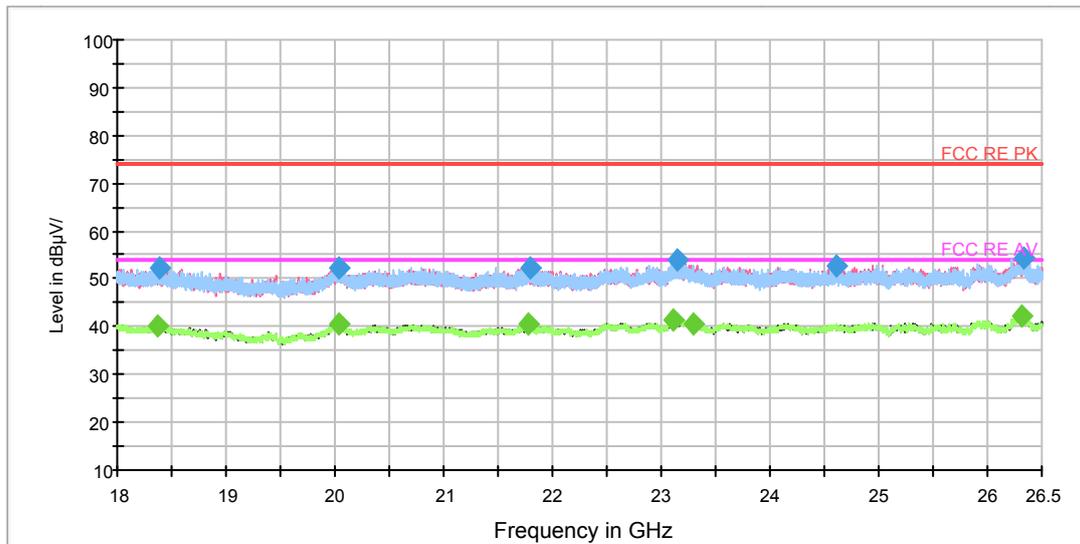
Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3969.375000	40.3	102.0	H	112.0	41.2	-0.9	33.7	74
5398.125000	43.0	102.0	H	3.0	45.5	2.5	31.0	74
6995.625000	45.4	102.0	V	302.0	51.9	6.5	28.6	74
9806.250000	44.9	102.0	H	85.0	54.8	9.9	29.1	74
12682.500000	51.5	102.0	H	30.0	65.7	14.2	22.5	74
17311.875000	61.5	102.0	V	0.0	85.7	24.2	12.5	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3999.375000	27.7	102.0	V	329.0	28.8	-1.1	26.3	54
4374.375000	31.7	102.0	V	275.0	32.1	0.4	22.3	54
6997.500000	33.5	102.0	H	279.0	40.0	6.5	20.5	54
9225.000000	32.9	102.0	H	279.0	42.8	9.9	21.1	54
12682.500000	42.1	102.0	H	30.0	56.3	14.2	11.9	54
18000.000000	49.5	102.0	V	164.0	75.0	25.5	4.5	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 18-26.5GHz PK+AV



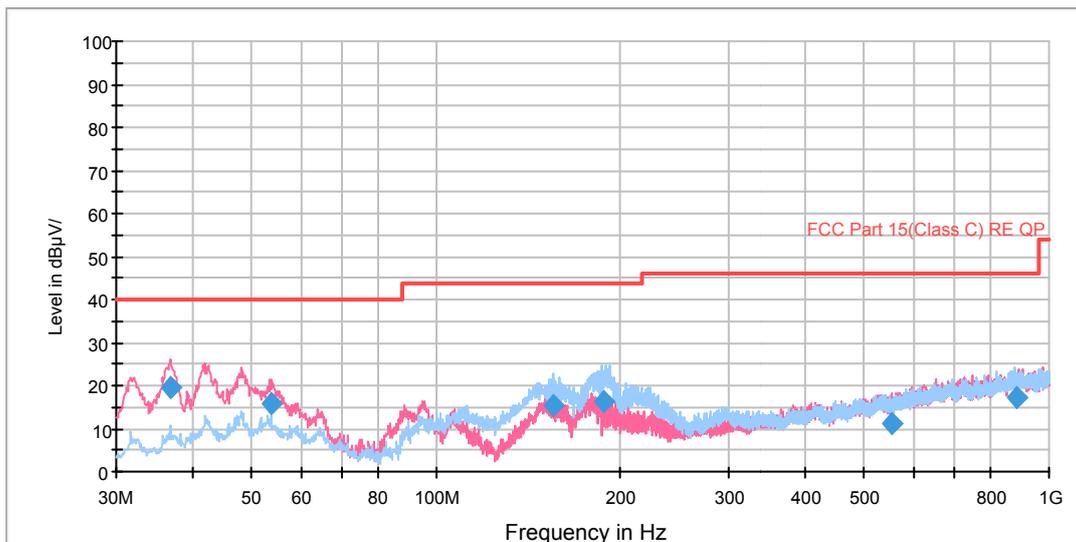
Radiates Emission from 18GHz to 26.5GHz

Frequency (MHz)	Peak (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18397.906250	52.2	H	271.0	55.7	-3.5	21.8	74
20028.843750	52.3	H	36.0	58.0	-5.7	21.7	74
21804.812500	52.4	V	0.0	60.4	-8.0	21.6	74
23151.000000	53.8	V	0.0	59.9	-6.1	20.2	74
24614.593750	52.8	V	283.0	58.8	-6.0	21.2	74
26336.906250	54.4	V	283.0	59.8	-5.4	19.6	74

Frequency (MHz)	Average (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18364.968750	40.3	V	304.0	43.6	-3.3	13.7	54
20037.875000	40.6	V	0.0	46.3	-5.7	13.4	54
21785.687500	40.4	V	198.0	48.4	-8.0	13.6	54
23115.937500	41.6	H	0.0	47.7	-6.1	12.4	54
23300.281250	40.6	H	227.0	46.6	-6.0	13.4	54
26307.687500	42.3	V	0.0	47.7	-5.4	11.7	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

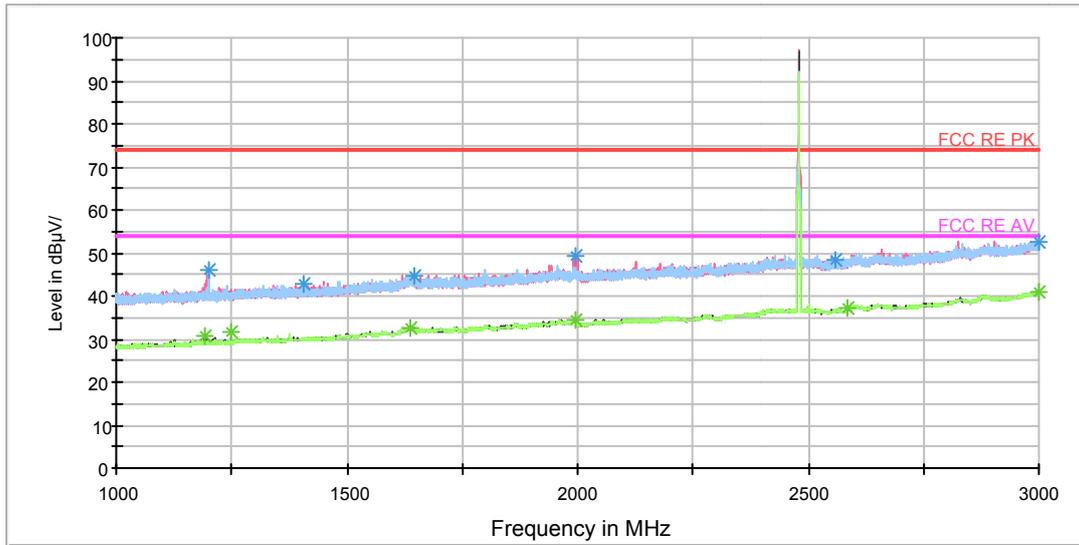
RE 30M-1GHz QP



Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
36.858025	19.6	100.0	V	311.0	41.8	-22.2	20.4	40.0
53.831534	15.6	100.0	V	262.0	36.4	-20.8	24.4	40.0
155.302175	15.2	125.0	H	290.0	44.3	-29.1	28.3	43.5
188.162566	16.2	100.0	H	278.0	43.5	-27.3	27.3	43.5
555.462250	11.3	100.0	V	241.0	29.7	-18.4	34.7	46.0
882.734000	17.1	125.0	H	200.0	30.0	-12.9	28.9	46.0

RE 1G-3GHz PK+AV



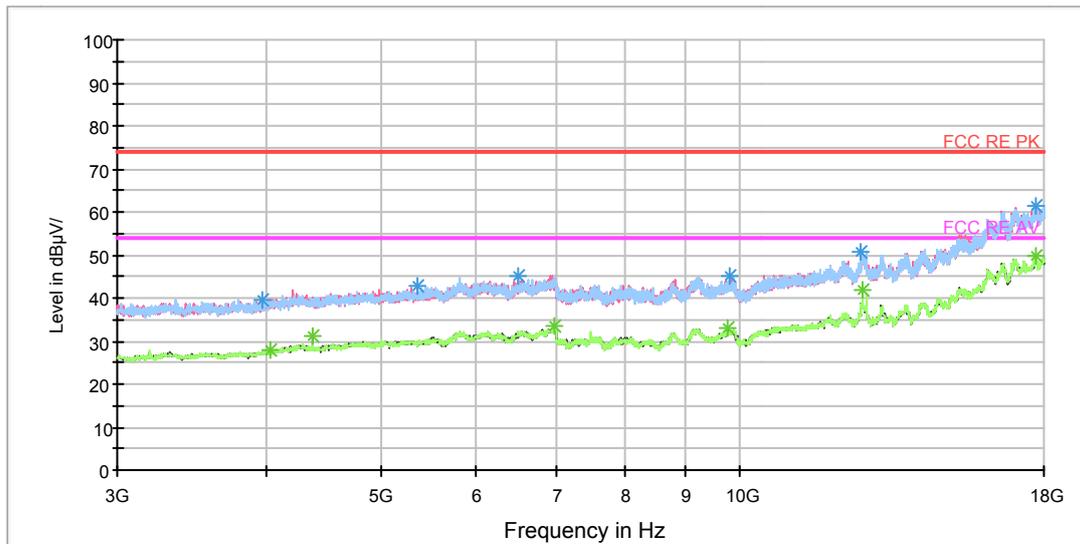
Radiates Emission from 1GHz to 3GHz
 Note: The signal beyond the limit is carrier.

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1199.250000	46.0	102.0	H	31.0	54.2	-8.2	28.0	74
1406.750000	42.7	102.0	H	0.0	49.8	-7.1	31.3	74
1644.750000	44.9	102.0	H	9.0	49.8	-4.9	29.1	74
1997.250000	49.4	202.0	V	148.0	52.7	-3.3	24.6	74
2559.000000	48.5	202.0	H	306.0	49.0	-0.5	25.5	74
2999.500000	52.6	102.0	V	0.0	54.9	2.3	21.4	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1193.500000	30.6	102.0	V	0.0	38.8	-8.2	23.4	54
1249.750000	31.6	102.0	H	0.0	39.6	-8.0	22.4	54
1638.500000	32.5	202.0	V	0.0	37.2	-4.7	21.5	54
1995.250000	34.5	102.0	V	331.0	37.7	-3.2	19.5	54
2587.000000	37.1	102.0	V	308.0	37.2	-0.1	16.9	54
2999.250000	40.9	202.0	H	351.0	43.2	2.3	13.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



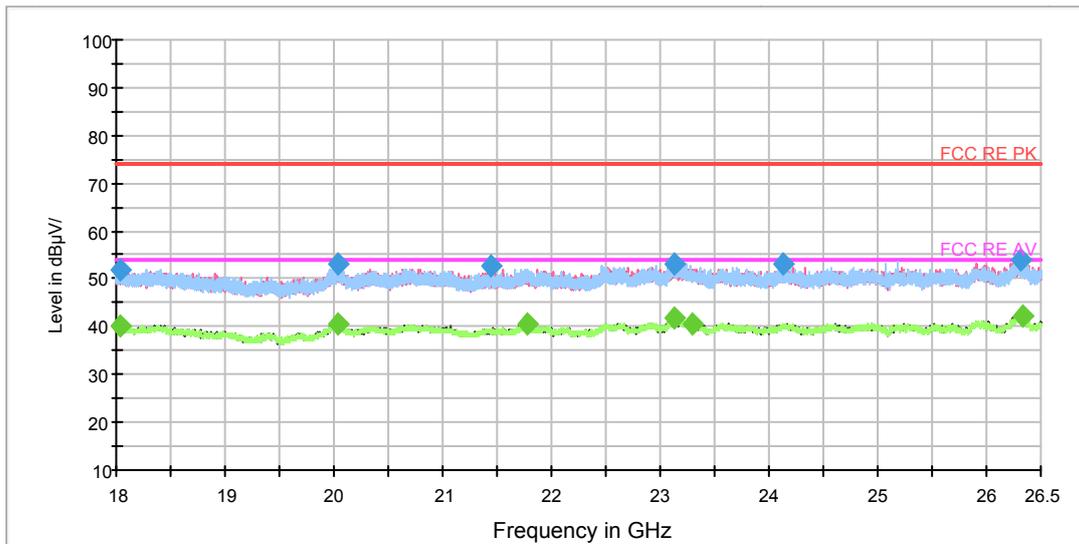
Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3975.000000	39.7	102.0	H	141.0	40.6	-0.9	34.3	74
5353.125000	43.0	102.0	V	53.0	45.3	2.3	31.0	74
6517.500000	45.3	102.0	H	59.0	50.8	5.5	28.7	74
9789.375000	44.9	102.0	H	224.0	54.8	9.9	29.1	74
12650.625000	50.8	102.0	H	0.0	64.9	14.1	23.2	74
17701.875000	61.5	102.0	V	165.0	86.2	24.7	12.5	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4040.625000	27.9	102.0	V	0.0	28.9	-1.0	26.1	54
4374.375000	31.1	102.0	V	247.0	31.5	0.4	22.9	54
6997.500000	33.3	102.0	H	59.0	39.8	6.5	20.7	54
9763.125000	32.8	102.0	V	359.0	42.4	9.6	21.2	54
12682.500000	41.7	102.0	H	168.0	55.9	14.2	12.3	54
17707.500000	49.6	102.0	H	0.0	74.3	24.7	4.4	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 18-26.5GHz PK+AV



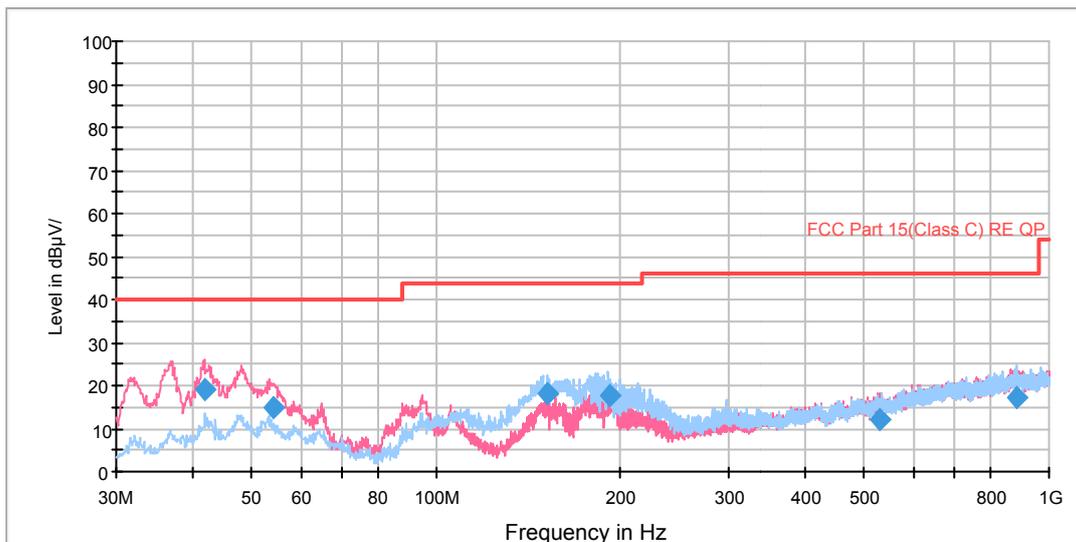
Radiates Emission from 18GHz to 26.5GHz

Frequency (MHz)	Peak (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18028.156250	52.0	H	227.0	53.9	-1.9	22.0	74
20043.718750	53.1	V	304.0	58.8	-5.7	20.9	74
21439.312500	52.7	H	204.0	60.7	-8.0	21.3	74
23121.781250	53.2	V	261.0	59.3	-6.1	20.8	74
24138.593750	53.0	V	197.0	58.9	-5.9	21.0	74
26321.500000	53.8	V	66.0	59.2	-5.4	20.2	74

Frequency (MHz)	Average (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18030.812500	40.2	H	318.0	42.1	-1.9	13.8	54
20032.031250	40.5	V	0.0	46.2	-5.7	13.5	54
21775.062500	40.4	V	0.0	48.4	-8.0	13.6	54
23131.343750	41.6	V	348.0	47.7	-6.1	12.4	54
23300.812500	40.7	V	261.0	46.7	-6.0	13.3	54
26333.187500	42.1	H	0.0	47.5	-5.4	11.9	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

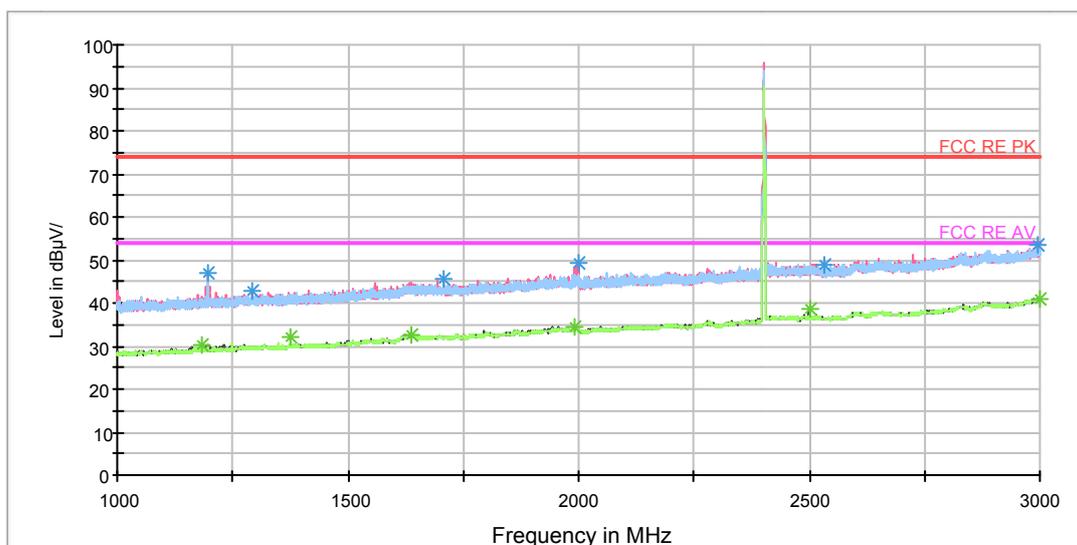
RE 30M-1GHz QP



Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
41.776847	19.1	100.0	V	276.0	39.5	-20.4	20.9	40.0
53.993428	15.1	100.0	V	204.0	36.0	-20.9	24.9	40.0
151.395662	18.2	126.0	H	281.0	47.4	-29.2	25.3	43.5
191.302450	17.7	121.0	H	281.0	44.7	-27.0	25.8	43.5
529.979250	12.1	100.0	V	294.0	30.5	-18.4	33.9	46.0
888.496750	17.3	121.0	H	218.0	29.9	-12.6	28.7	46.0

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

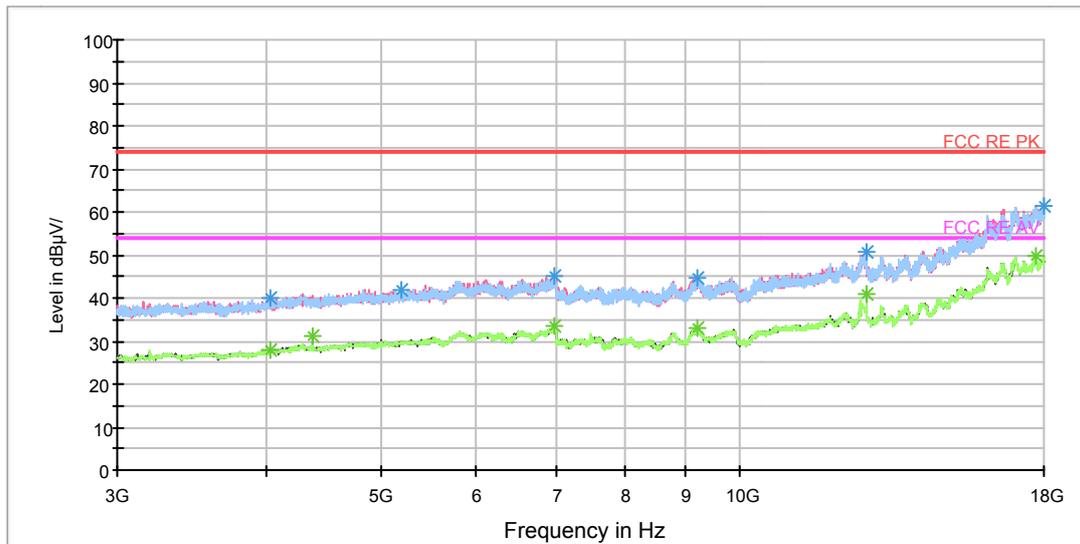
Note: The signal beyond the limit is carrier.

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1195.500000	46.8	102.0	V	0.0	55.0	-8.2	27.2	74
1291.000000	43.0	102.0	V	304.0	50.7	-7.7	31.0	74
1708.250000	45.7	202.0	V	0.0	50.5	-4.8	28.3	74
1998.000000	49.2	202.0	V	143.0	52.6	-3.4	24.8	74
2533.000000	48.8	202.0	H	0.0	49.2	-0.4	25.2	74
2994.000000	53.4	102.0	V	236.0	55.7	2.3	20.6	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1183.250000	30.4	102.0	V	0.0	38.4	-8.0	23.6	54
1375.000000	32.0	102.0	H	52.0	39.1	-7.1	22.0	54
1638.500000	32.4	102.0	H	287.0	37.1	-4.7	21.6	54
1992.750000	34.3	202.0	V	241.0	37.6	-3.3	19.7	54
2500.000000	38.8	202.0	V	28.0	39.0	-0.2	15.2	54
2999.250000	41.0	202.0	H	260.0	43.3	2.3	13.0	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



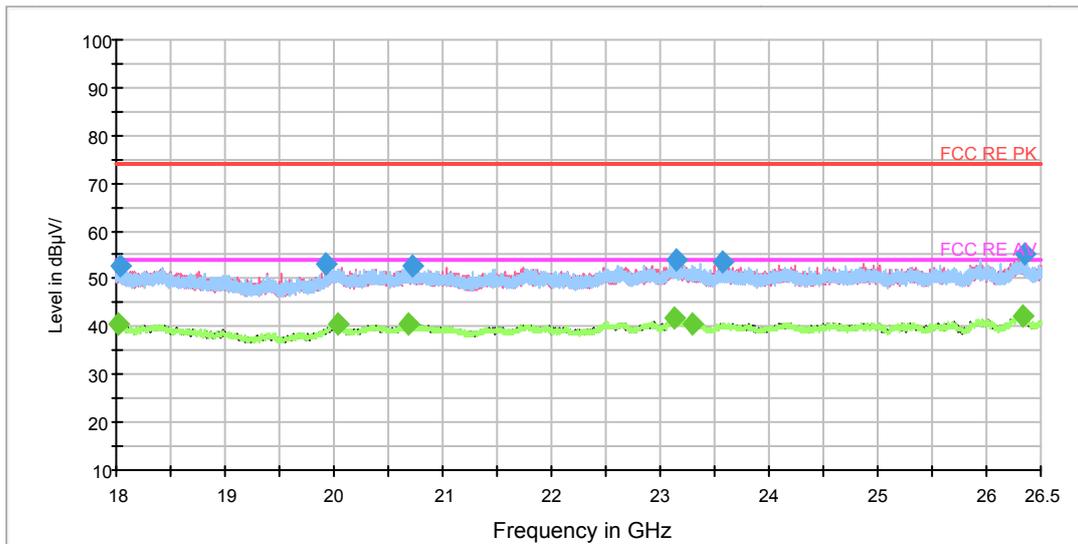
Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4040.625000	39.8	102.0	V	0.0	40.8	-1.0	34.2	74
5201.250000	42.1	102.0	H	57.0	44.2	2.1	31.9	74
6980.625000	45.2	102.0	H	168.0	51.6	6.4	28.8	74
9200.625000	44.8	102.0	V	355.0	55.1	10.3	29.2	74
12761.250000	50.5	102.0	H	0.0	64.5	14.0	23.5	74
17975.625000	61.6	102.0	V	81.0	86.5	24.9	12.4	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4036.875000	27.8	102.0	V	355.0	28.8	-1.0	26.2	54
4374.375000	31.3	102.0	V	247.0	31.7	0.4	22.7	54
6995.625000	33.3	102.0	V	220.0	39.8	6.5	20.7	54
9215.625000	32.9	102.0	V	165.0	42.9	10.0	21.1	54
12763.125000	40.8	102.0	H	0.0	54.7	13.9	13.2	54
17709.375000	49.6	102.0	H	0.0	74.3	24.7	4.4	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

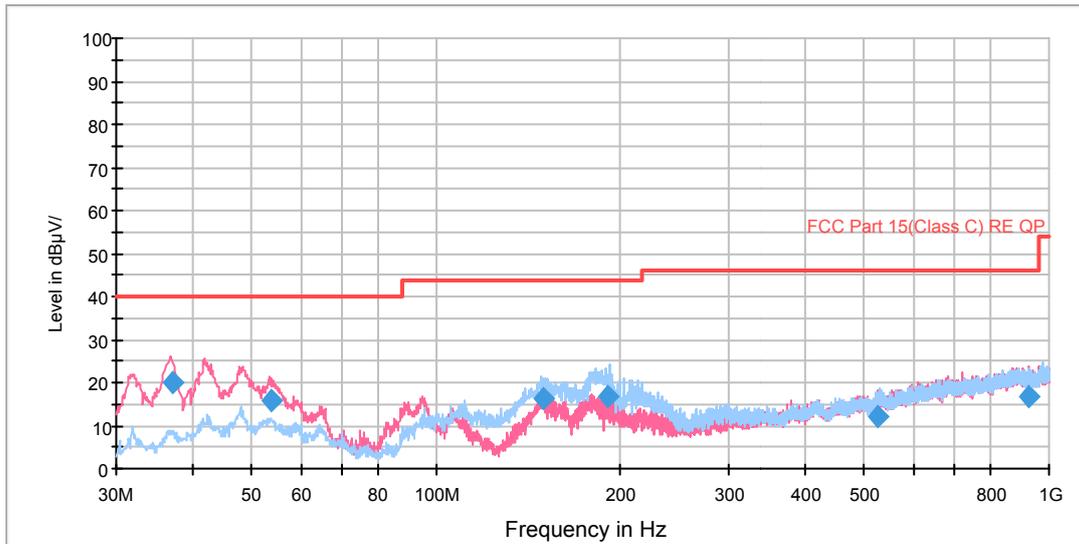
Frequency (MHz)	Peak (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18041.968750	52.9	V	0.0	54.9	-2.0	21.1	74
19927.375000	53.0	V	266.0	58.7	-5.7	21.0	74
20720.531250	52.6	V	308.0	59.3	-6.7	21.4	74
23139.312500	54.1	H	0.0	60.2	-6.1	19.9	74
23574.406250	53.3	H	162.0	59.2	-5.9	20.7	74
26344.875000	55.1	H	0.0	60.5	-5.4	18.9	74

Frequency (MHz)	Average (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18019.656250	40.4	V	0.0	42.3	-1.9	13.6	54
20031.500000	40.8	H	141.0	46.5	-5.7	13.2	54
20680.687500	40.5	V	0.0	47.1	-6.6	13.5	54
23131.875000	41.9	H	249.0	48.0	-6.1	12.1	54
23297.093750	40.7	H	271.0	46.7	-6.0	13.3	54
26327.343750	42.3	V	202.0	47.7	-5.4	11.7	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)



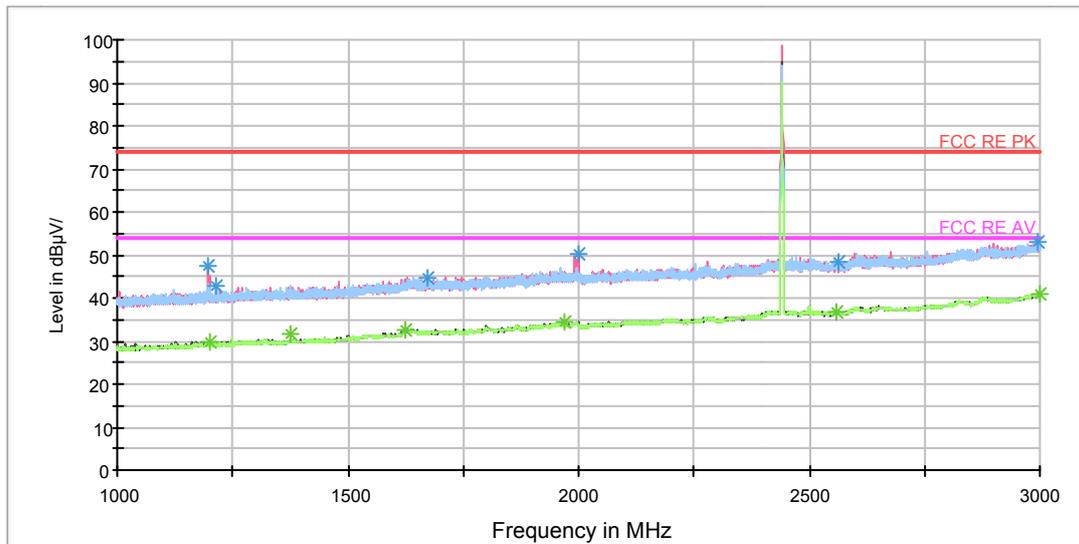
RE 30M-1GHz QP



Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
37.003528	19.8	100.0	V	131.0	41.9	-22.1	20.2	40.0
53.872481	15.7	100.0	V	244.0	36.5	-20.8	24.3	40.0
148.931044	16.3	125.0	H	291.0	45.6	-29.3	27.2	43.5
191.106238	16.5	100.0	H	259.0	43.6	-27.1	27.0	43.5
527.215750	12.0	100.0	H	23.0	30.6	-18.6	34.0	46.0
930.311000	17.0	120.0	V	72.0	30.0	-13.0	29.0	46.0

RE 1G-3GHz PK+AV



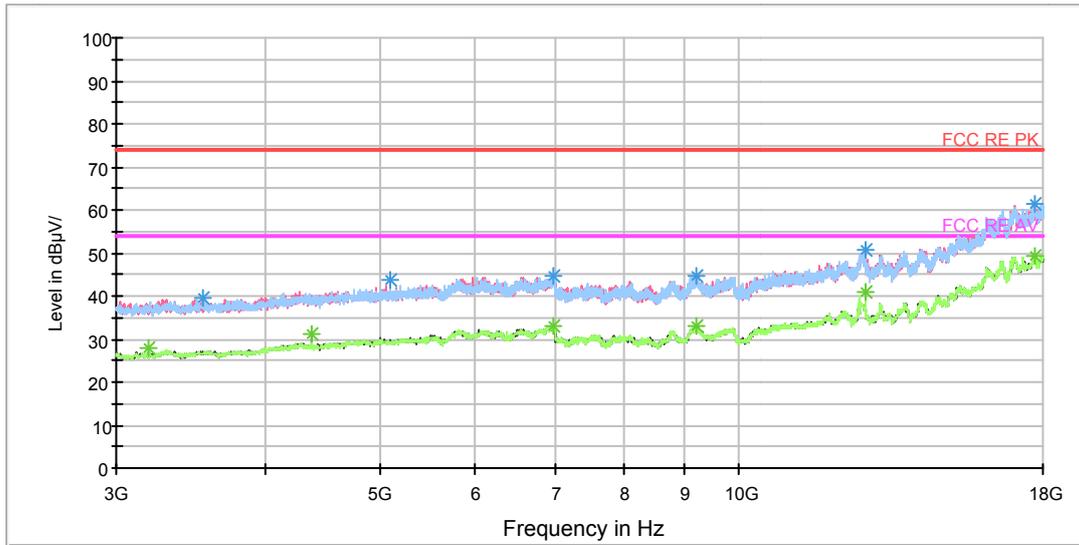
Radiates Emission from 1GHz to 3GHz
 Note: The signal beyond the limit is carrier.

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1195.750000	47.4	102.0	V	0.0	55.6	-8.2	26.6	74
1212.750000	42.8	202.0	H	260.0	50.8	-8.0	31.2	74
1670.500000	44.7	202.0	V	97.0	49.8	-5.1	29.3	74
1999.250000	50.3	102.0	V	352.0	53.7	-3.4	23.7	74
2564.750000	48.5	202.0	V	213.0	49.1	-0.6	25.5	74
2994.250000	52.8	102.0	V	328.0	55.1	2.3	21.2	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1199.250000	29.9	102.0	V	0.0	38.1	-8.2	24.1	54
1375.000000	31.8	102.0	H	55.0	38.9	-7.1	22.2	54
1625.750000	32.5	102.0	V	0.0	37.3	-4.8	21.5	54
1967.750000	34.4	102.0	V	352.0	37.9	-3.5	19.6	54
2557.250000	36.6	102.0	V	0.0	37.1	-0.5	17.4	54
2999.250000	41.0	102.0	H	194.0	43.3	2.3	13.0	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



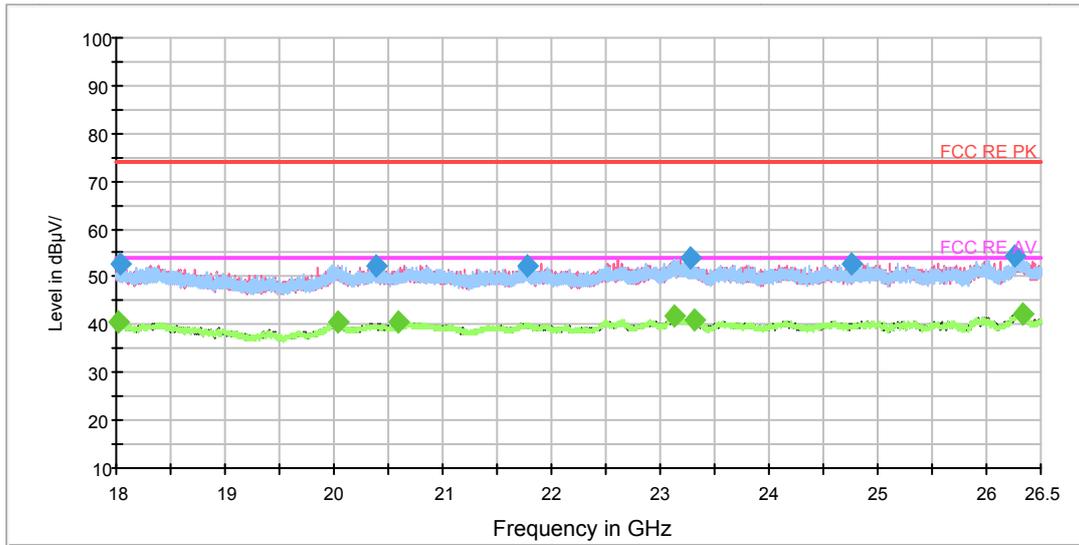
Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3541.875000	39.5	102.0	V	0.0	41.7	-2.2	34.5	74
5101.875000	43.8	102.0	H	140.0	45.6	1.8	30.2	74
6997.500000	44.6	102.0	H	0.0	51.1	6.5	29.4	74
9221.250000	44.7	102.0	H	3.0	54.6	9.9	29.3	74
12761.250000	50.6	102.0	H	0.0	64.6	14.0	23.4	74
17705.625000	61.6	102.0	H	85.0	86.3	24.7	12.4	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3198.750000	27.9	102.0	H	251.0	30.8	-2.9	26.1	54
4374.375000	31.0	102.0	V	247.0	31.4	0.4	23.0	54
6997.500000	33.2	102.0	V	0.0	39.7	6.5	20.8	54
9225.000000	32.9	102.0	H	0.0	42.8	9.9	21.1	54
12763.125000	40.8	102.0	H	0.0	54.7	13.9	13.2	54
17715.000000	49.4	102.0	V	329.0	74.0	24.6	4.6	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 18-26.5GHz PK+AV



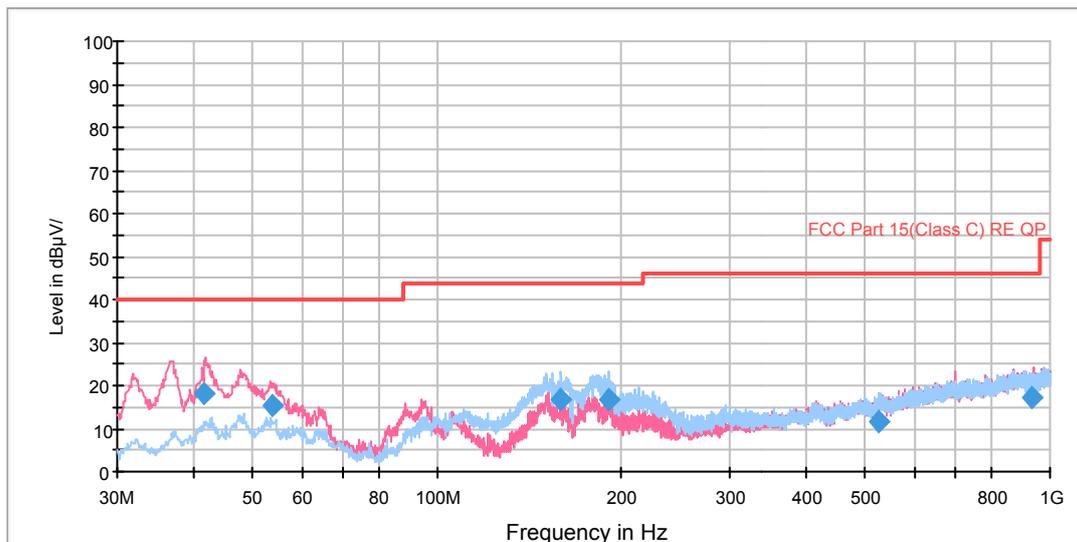
Radiates Emission from 18GHz to 26.5GHz

Frequency (MHz)	Peak (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18038.781250	52.6	V	111.0	54.6	-2.0	21.4	74
20395.937500	52.5	H	58.0	58.6	-6.1	21.5	74
21779.843750	52.4	H	100.0	60.4	-8.0	21.6	74
23281.156250	54.0	H	319.0	60.0	-6.0	20.0	74
24768.125000	52.9	H	0.0	58.9	-6.0	21.1	74
26258.812500	54.2	H	0.0	59.6	-5.4	19.8	74

Frequency (MHz)	Average (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18021.781250	40.5	H	0.0	42.4	-1.9	13.5	54
20038.406250	40.6	H	163.0	46.3	-5.7	13.4	54
20590.375000	40.4	V	0.0	46.8	-6.4	13.6	54
23135.062500	41.7	H	228.0	47.8	-6.1	12.3	54
23307.718750	40.8	V	260.0	46.8	-6.0	13.2	54
26328.406250	42.4	V	175.0	47.8	-5.4	11.6	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

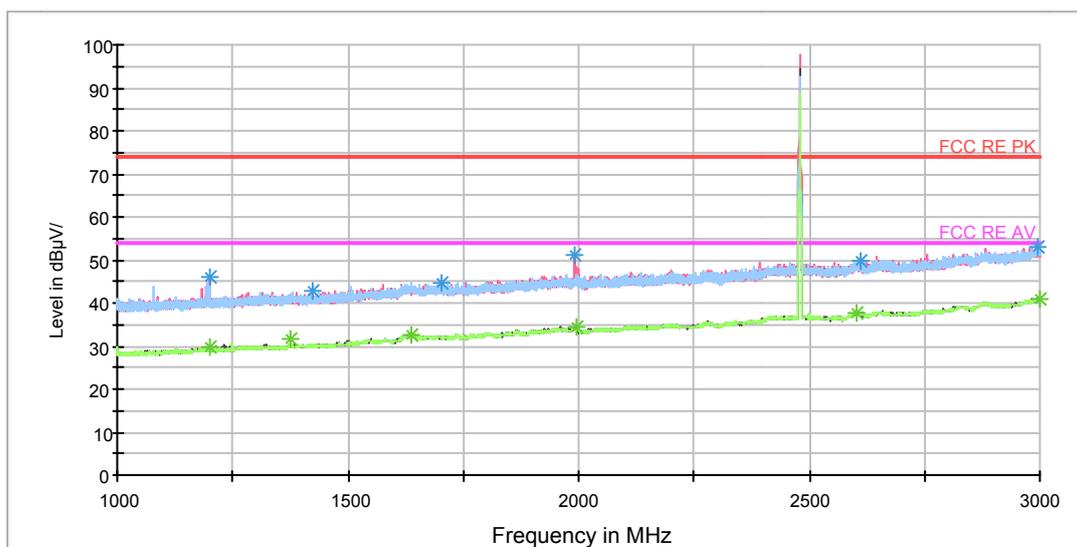
RE 30M-1GHz QP



Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
41.656847	18.3	100.0	V	241.0	38.7	-20.4	21.7	40.0
53.872481	15.3	100.0	V	211.0	36.1	-20.8	24.7	40.0
158.974369	16.8	125.0	H	289.0	45.6	-28.8	26.7	43.5
190.218662	16.8	100.0	H	277.0	44.0	-27.2	26.7	43.5
524.539000	11.8	125.0	V	88.0	30.5	-18.7	34.2	46.0
936.139000	17.0	100.0	V	314.0	30.1	-13.1	29.0	46.0

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

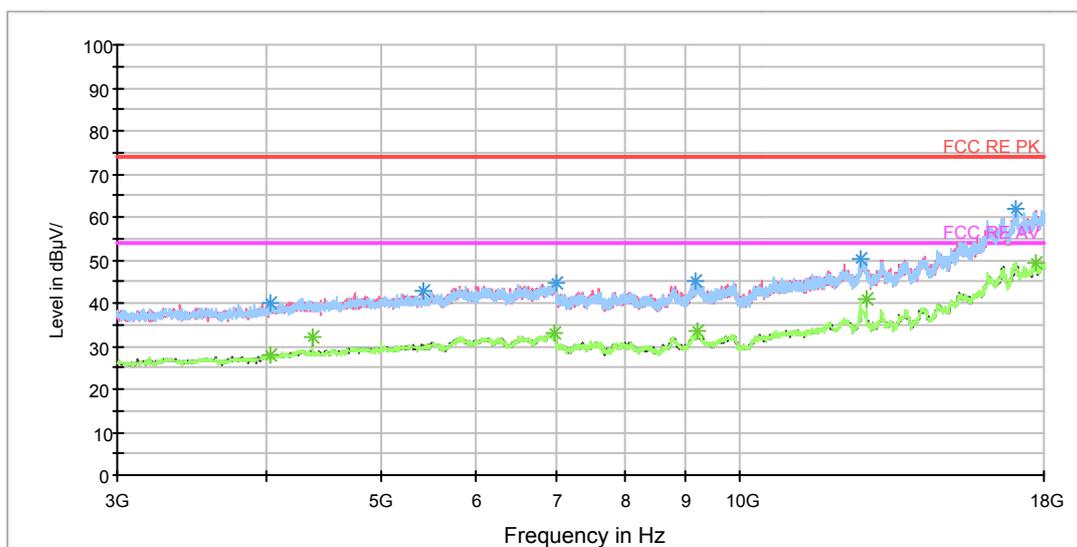
Note: The signal beyond the limit is carrier.

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1199.250000	46.2	102.0	V	0.0	54.4	-8.2	27.8	74
1422.500000	42.6	202.0	V	0.0	49.5	-6.9	31.4	74
1702.250000	44.8	102.0	V	145.0	49.7	-4.9	29.2	74
1991.750000	51.3	202.0	V	338.0	54.6	-3.3	22.7	74
2613.000000	49.6	102.0	H	0.0	49.7	0.1	24.4	74
2993.750000	53.1	202.0	H	309.0	55.3	2.2	20.9	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1200.750000	29.9	102.0	V	0.0	38.1	-8.2	24.1	54
1375.000000	31.6	102.0	H	51.0	38.7	-7.1	22.4	54
1639.500000	32.5	102.0	V	0.0	37.2	-4.7	21.5	54
1995.000000	34.3	202.0	H	285.0	37.5	-3.2	19.7	54
2602.000000	37.8	102.0	V	0.0	38.2	0.4	16.2	54
2999.250000	40.9	202.0	V	31.0	43.2	2.3	13.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 3-18GHz PK+AV



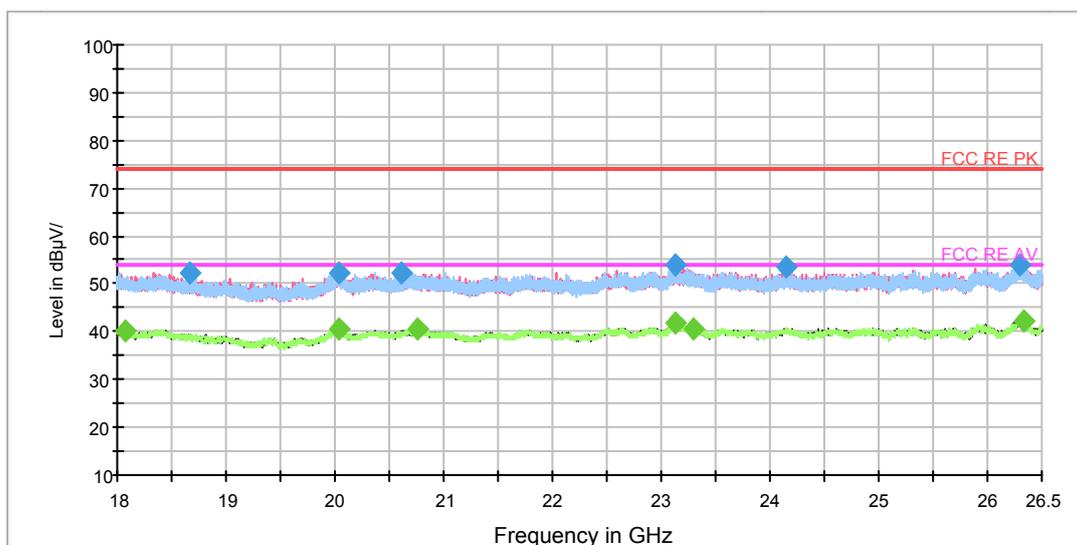
Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4035.000000	39.9	102.0	V	246.0	40.9	-1.0	34.1	74
5430.000000	42.9	102.0	V	220.0	45.7	2.8	31.1	74
6999.375000	44.7	102.0	V	246.0	51.2	6.5	29.3	74
9157.500000	44.9	102.0	V	301.0	55.2	10.3	29.1	74
12639.375000	50.2	102.0	H	114.0	64.7	14.5	23.8	74
17055.000000	61.9	102.0	V	81.0	86.3	24.4	12.1	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4033.125000	27.8	102.0	H	0.0	28.9	-1.1	26.2	54
4374.375000	31.9	102.0	V	274.0	32.3	0.4	22.1	54
6995.625000	33.2	102.0	H	114.0	39.7	6.5	20.8	54
9215.625000	33.3	102.0	H	0.0	43.3	10.0	20.7	54
12763.125000	41.0	102.0	H	0.0	54.9	13.9	13.0	54
17701.875000	49.4	102.0	H	114.0	74.1	24.7	4.6	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

Frequency (MHz)	Peak (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18657.687500	52.4	V	219.0	56.7	-4.3	21.6	74
20039.468750	52.4	H	77.0	58.1	-5.7	21.6	74
20618.000000	52.2	V	0.0	58.7	-6.5	21.8	74
23131.343750	53.9	H	35.0	60.0	-6.1	20.1	74
24151.343750	53.5	H	35.0	59.4	-5.9	20.5	74
26293.343750	53.9	H	248.0	59.3	-5.4	20.1	74

Frequency (MHz)	Average (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18072.781250	40.3	V	0.0	42.4	-2.1	13.7	54
20034.687500	40.4	V	0.0	46.1	-5.7	13.6	54
20759.843750	40.4	H	0.0	47.2	-6.8	13.6	54
23130.812500	41.6	V	283.0	47.7	-6.1	12.4	54
23297.093750	40.7	V	42.0	46.7	-6.0	13.3	54
26340.625000	42.3	H	13.0	47.7	-5.4	11.7	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

4.11 Conducted Emission

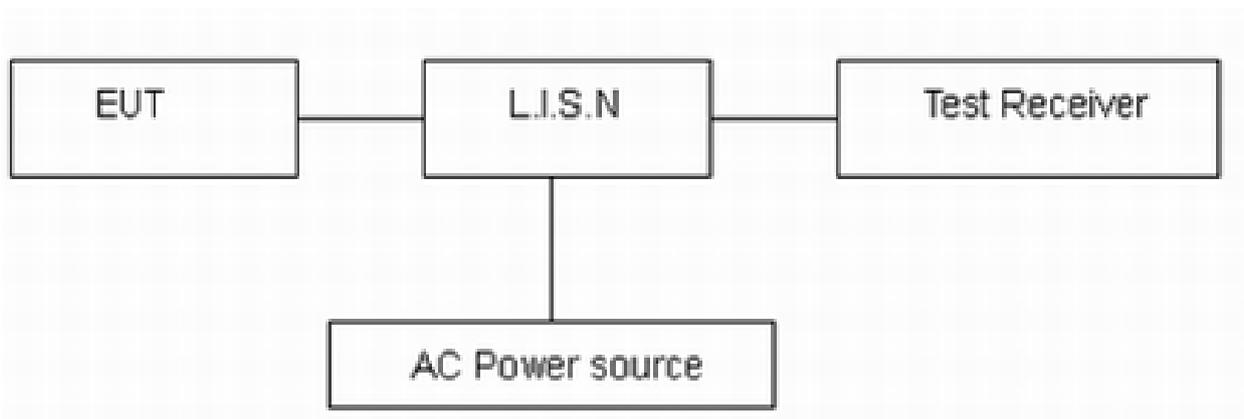
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.10-2013. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line. The test is in transmitting mode.

Test Setup



Note: AC Power source is used to change the voltage from 220V/50Hz to 110V/60Hz.

Limits

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50

*: Decreases with the logarithm of the frequency.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U=2.69$ dB.



Test Results:

Following plots, Blue trace uses the peak detection; Green trace uses the average detection.

Basic Rate-CH0 L Line		Final Result	
		Frequency (MHz)	QuasiPeak (dBµV)
		Average (dBµV)	Limit (dBµV)
		Margin (dB)	Meas. Time (ms)
		Bandwidth (kHz)	Line
		Filter	Corr. (dB)
		0.291750	---
		0.291750	30.95
		0.591000	---
		0.591000	31.44
		1.151250	---
		1.151250	29.08
		1.153500	---
		1.153500	18.78
		2.307750	---
		2.307750	24.38
		2.499000	---
		2.499000	16.47
		10.387500	---
		10.387500	21.46
		10.981500	---
		10.981500	31.13
		18.289500	---
		18.289500	25.62
		18.523500	---
		18.523500	39.00

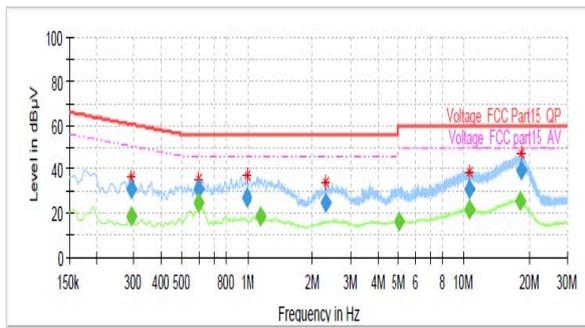
Basic Rate-CH0 N Line		Final Result	
		Frequency (MHz)	QuasiPeak (dBµV)
		Average (dBµV)	Limit (dBµV)
		Margin (dB)	Meas. Time (ms)
		Bandwidth (kHz)	Line
		Filter	Corr. (dB)
		0.179250	38.25
		0.186000	---
		0.186000	24.00
		0.582000	---
		0.582000	27.51
		0.586500	32.00
		0.586500	---
		0.881250	---
		0.881250	22.59
		1.122000	---
		1.122000	16.75
		4.551000	---
		4.551000	18.78
		4.647750	---
		4.647750	16.17
		9.939750	---
		9.939750	28.00
		10.785750	---
		10.785750	21.17
		16.867500	---
		16.867500	24.14
		17.529000	---
		17.529000	37.43

Basic Rate-CH39 L Line		Final Result	
		Frequency (MHz)	QuasiPeak (dBµV)
		Average (dBµV)	Limit (dBµV)
		Margin (dB)	Meas. Time (ms)
		Bandwidth (kHz)	Line
		Filter	Corr. (dB)
		0.179250	38.05
		0.192750	---
		0.192750	24.69
		0.591000	---
		0.591000	24.85
		0.593250	31.21
		0.593250	---
		1.077000	---
		1.077000	18.72
		1.149000	---
		1.149000	29.16
		2.496750	---
		2.496750	16.67
		2.586750	---
		2.586750	25.57
		10.320000	---
		10.320000	21.50
		10.612500	---
		10.612500	31.30
		17.189250	---
		17.189250	25.87
		18.021750	---
		18.021750	39.37

Basic Rate-CH39 N Line		Final Result	
		Frequency (MHz)	QuasiPeak (dBµV)
		Average (dBµV)	Limit (dBµV)
		Margin (dB)	Meas. Time (ms)
		Bandwidth (kHz)	Line
		Filter	Corr. (dB)
		0.186000	---
		0.186000	23.78
		0.186000	39.50
		0.582000	---
		0.582000	27.98
		0.586500	31.49
		0.586500	---
		1.108500	---
		1.108500	22.45
		1.122000	---
		1.122000	16.68
		3.331500	---
		3.331500	16.77
		5.061750	---
		5.061750	15.97
		10.326750	---
		10.326750	20.87
		10.837500	---
		10.837500	28.07
		17.171250	---
		17.171250	37.53
		17.351250	---
		17.351250	23.87



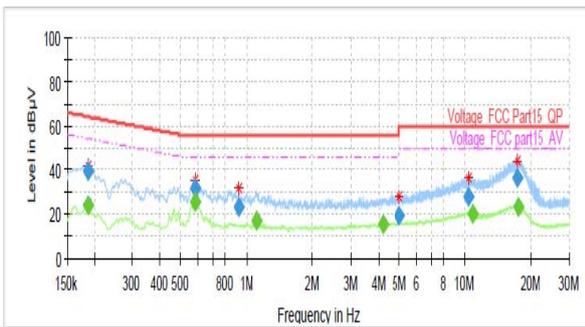
Basic Rate-CH78 L Line



Final Result

Table with 10 columns: Frequency (MHz), QuasiPeak (dBµV), Average (dBµV), Limit (dBµV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data for Basic Rate-CH78 L Line.

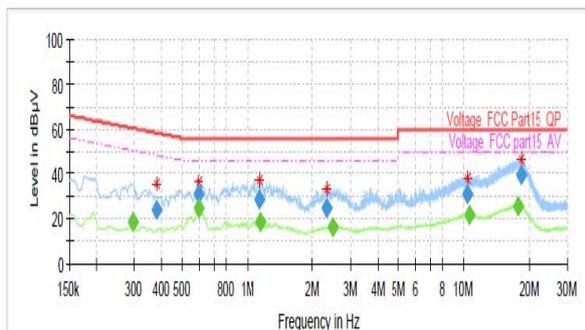
Basic Rate-CH78 N Line



Final Result

Table with 10 columns: Frequency (MHz), QuasiPeak (dBµV), Average (dBµV), Limit (dBµV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data for Basic Rate-CH78 N Line.

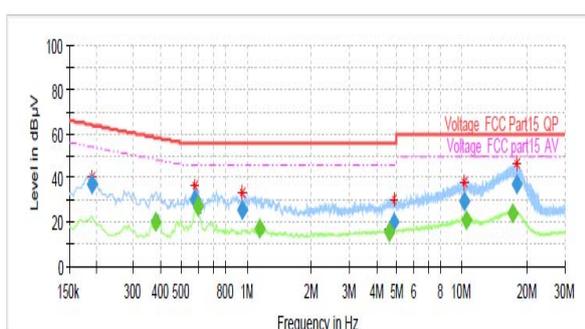
EDR-CH0 L Line



Final Result

Table with 10 columns: Frequency (MHz), QuasiPeak (dBµV), Average (dBµV), Limit (dBµV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data for EDR-CH0 L Line.

EDR-CH0 N Line

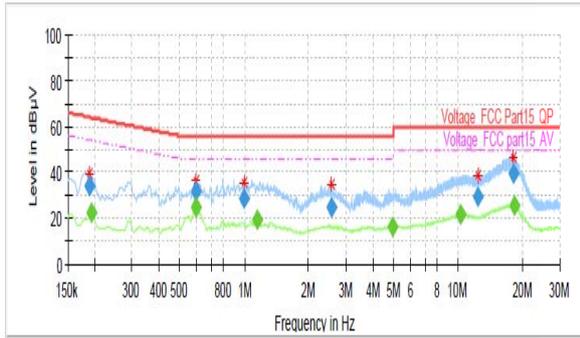


Final Result

Table with 10 columns: Frequency (MHz), QuasiPeak (dBµV), Average (dBµV), Limit (dBµV), Margin (dB), Meas. Time (ms), Bandwidth (kHz), Line, Filter, Corr. (dB). Contains 15 rows of test data for EDR-CH0 N Line.



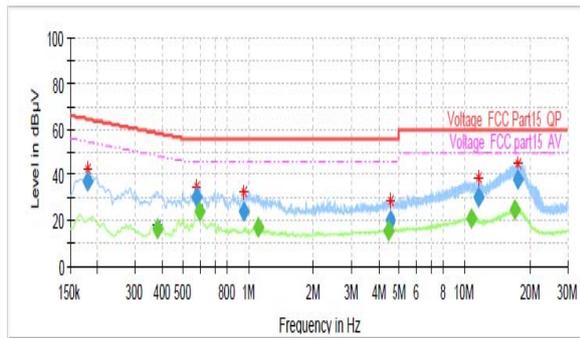
EDR-CH39 L Line



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.188250	34.08	---	64.11	30.04	1000.0	9.000	L1	ON	19.2
0.192750	---	22.81	53.92	31.11	1000.0	9.000	L1	ON	19.2
0.391000	---	25.02	46.00	20.98	1000.0	9.000	L1	ON	19.3
0.393250	31.63	---	56.00	24.37	1000.0	9.000	L1	ON	19.3
0.989250	28.56	---	56.00	27.44	1000.0	9.000	L1	ON	19.2
1.153500	---	19.20	46.00	26.80	1000.0	9.000	L1	ON	19.2
2.582250	24.97	---	56.00	31.03	1000.0	9.000	L1	ON	19.0
4.940250	---	16.35	46.00	29.65	1000.0	9.000	L1	ON	19.1
10.266000	---	21.48	50.00	28.52	1000.0	9.000	L1	ON	19.4
12.374250	29.67	---	60.00	30.33	1000.0	9.000	L1	ON	19.4
18.073500	39.41	---	60.00	20.59	1000.0	9.000	L1	ON	19.5
18.402000	---	25.49	50.00	24.51	1000.0	9.000	L1	ON	19.6

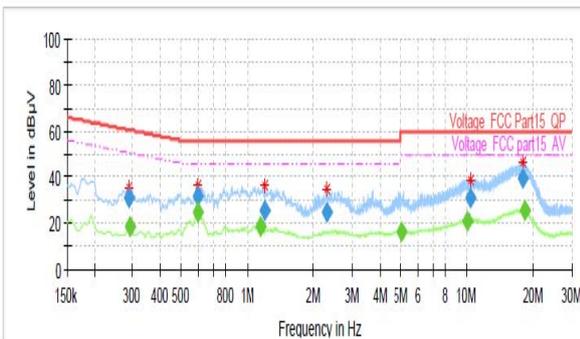
EDR-CH39 N Line



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.181500	37.36	---	64.42	27.05	1000.0	9.000	N	ON	19.2
0.379500	---	15.94	48.29	32.35	1000.0	9.000	N	ON	19.2
0.573000	30.31	---	56.00	25.69	1000.0	9.000	N	ON	19.3
0.593250	---	24.31	46.00	21.69	1000.0	9.000	N	ON	19.3
0.951000	23.97	---	56.00	32.03	1000.0	9.000	N	ON	19.2
1.122000	---	16.90	46.00	29.10	1000.0	9.000	N	ON	19.2
4.456500	---	15.84	46.00	30.16	1000.0	9.000	N	ON	19.1
4.521750	20.30	---	56.00	35.70	1000.0	9.000	N	ON	19.1
10.718250	---	20.83	50.00	29.17	1000.0	9.000	N	ON	19.4
11.546250	30.18	---	60.00	29.82	1000.0	9.000	N	ON	19.4
17.020500	---	24.45	50.00	25.55	1000.0	9.000	N	ON	19.5
17.650500	37.73	---	60.00	22.27	1000.0	9.000	N	ON	19.5

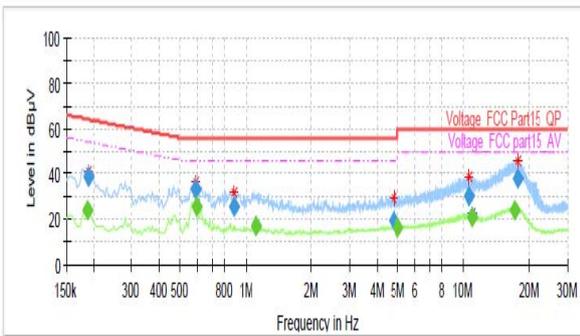
EDR-CH78 L Line



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.289500	31.11	---	60.54	29.43	1000.0	9.000	L1	ON	19.2
0.291750	---	18.50	50.47	31.97	1000.0	9.000	L1	ON	19.2
0.591000	---	25.10	46.00	20.90	1000.0	9.000	L1	ON	19.3
0.593250	31.56	---	56.00	24.44	1000.0	9.000	L1	ON	19.3
1.153500	---	18.80	46.00	27.20	1000.0	9.000	L1	ON	19.2
1.203000	25.64	---	56.00	30.36	1000.0	9.000	L1	ON	19.2
2.292000	24.47	---	56.00	31.53	1000.0	9.000	L1	ON	19.0
5.066250	---	16.33	50.00	33.67	1000.0	9.000	L1	ON	19.1
10.115250	---	21.27	50.00	28.73	1000.0	9.000	L1	ON	19.4
10.419000	30.75	---	60.00	29.25	1000.0	9.000	L1	ON	19.4
17.873250	39.30	---	60.00	20.70	1000.0	9.000	L1	ON	19.6
18.332250	---	25.53	50.00	24.47	1000.0	9.000	L1	ON	19.5

EDR-CH78 N Line



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.186000	---	24.35	54.21	29.87	1000.0	9.000	N	ON	19.2
0.188250	38.60	---	64.11	25.51	1000.0	9.000	N	ON	19.2
0.586500	33.34	---	56.00	22.66	1000.0	9.000	N	ON	19.3
0.591000	---	25.61	46.00	20.39	1000.0	9.000	N	ON	19.3
0.879000	25.29	---	56.00	30.71	1000.0	9.000	N	ON	19.2
1.122000	---	17.01	46.00	28.99	1000.0	9.000	N	ON	19.2
4.780500	19.04	---	56.00	36.96	1000.0	9.000	N	ON	19.1
5.010000	---	15.95	50.00	34.05	1000.0	9.000	N	ON	19.1
10.675500	30.50	---	60.00	29.50	1000.0	9.000	N	ON	19.4
10.945500	---	21.17	50.00	28.83	1000.0	9.000	N	ON	19.4
17.178000	---	24.23	50.00	25.77	1000.0	9.000	N	ON	19.5
17.664000	37.80	---	60.00	22.20	1000.0	9.000	N	ON	19.5

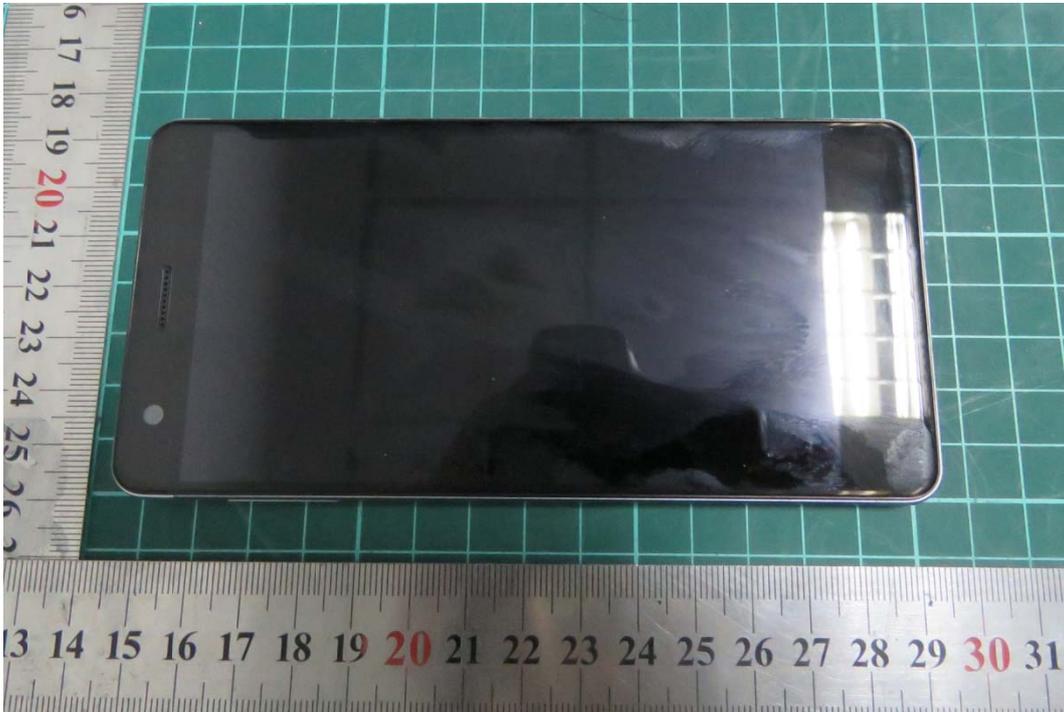
5 Main Test Instruments

Name	Type	Manufacturer	Serial Number	Calibration Date	Expiration Time
BT Base Station Simulator	CBT	R&S	100271	2016-05-21	2017-05-20
Loop Antenna	FMZB1519	SCHWARZBECK	1519-047	2014-02-29	2017-02-28
EMI Test Receiver	ESCS30	R&S	100138	2015-12-17	2016-12-16
Artificial main network	ENV216	R&S	101171	2013-12-18	2016-12-17
Signal Analyzer	FSV30	R&S	100815	2015-12-17	2016-12-16
EMI Test Receiver	ESCI	R&S	100948	2016-06-01	2017-05-31
TRILOG Broadband Antenna	VULB 9163	Schwarzbeck	9163-201	2014-12-06	2017-12-05
Double Ridged Waveguide Horn Antenna	HF907	R&S	100126	2014-12-06	2017-12-05
Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	NA	NA
Spectrum Analyzer	N9010A	Agilent	MY47191109	2016-05-21	2017-05-20
Standard Gain Horn	3160-09	ETS-Lindgren	00102644	2015-01-30	2018-01-29
RF Cable	SMA 15cm	Agilent	0001	2016-10-16	2016-12-15

*****END OF REPORT *****

ANNEX A: EUT Appearance and Test Setup

A.1 EUT Appearance



Front Side

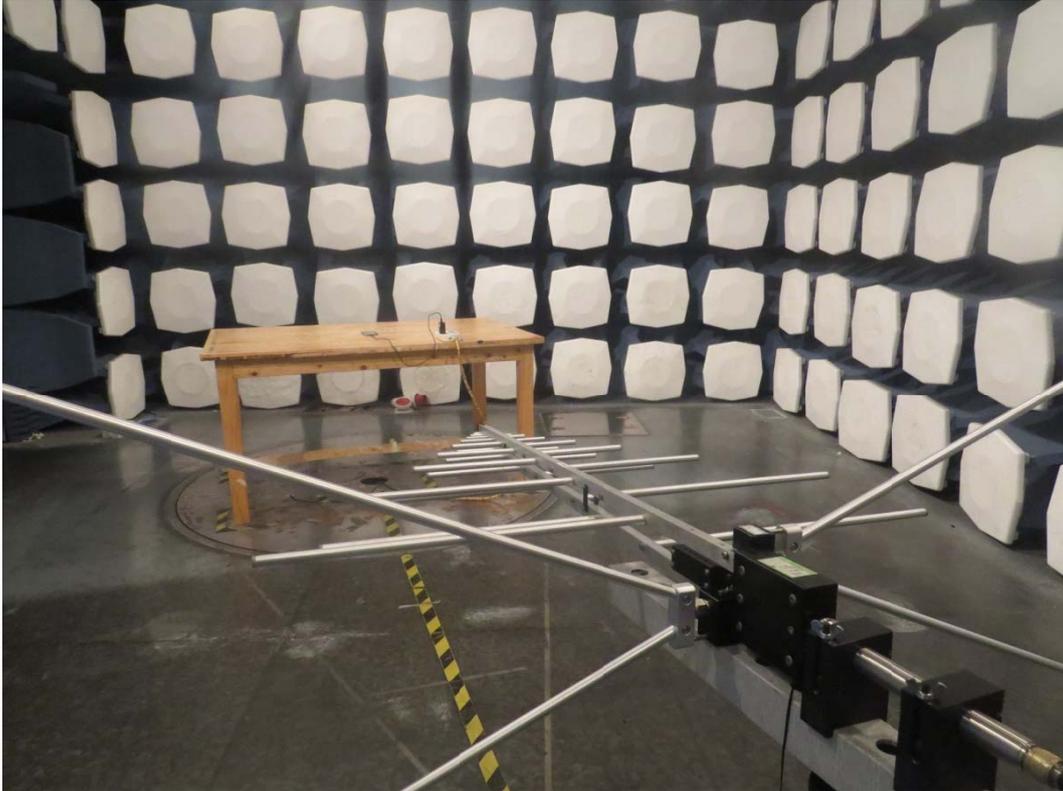


Back Side

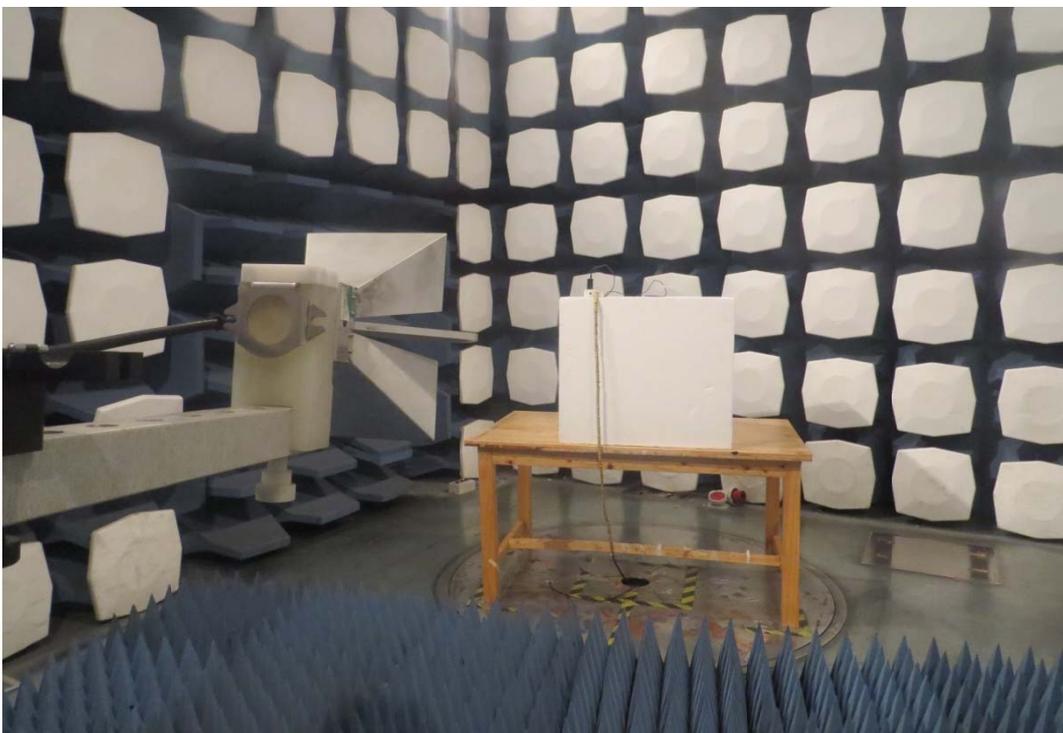
a: EUT

Picture 1 EUT and Accessory

A.2 Test Setup



Below 1GHz



Above 1GHz

Picture 2 Radiated Emission Test Setup



Picture 3 Conducted Emission Test Setup