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TEST REPORT

Report Number: 17010545HKG-002

Application
for
Original Grant of 47 CFR Part 15 Certification
New Family of RSS-247 Issue 1 Equipment Certification

Video Monitor - Parent Unit

FCC ID: EW780-0621-01

IC: 1135B-80062101

Prepared and Checked by:

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GENERAL INFORMATION

Applicant Name:	VTech Telecommunications Ltd.
Applicant Address:	23/F., Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road, Tai Po, Hong Kong.
FCC Specification Standard:	FCC Part 15, October 1, 2015 Edition
FCC ID:	EW780-0621-01
FCC Model(s):	VM5271 PU, VM5271-2 PU, VM5x71-ab PU
IC Specification Standard:	RSS-247 Issue 1, May 2015 RSS-Gen Issue 4, December 2014
IC:	1135B-80062101
HVIN:	VM5271 PU, VM5271-2 PU
PMN:	Video monitor
Type of EUT:	Spread Spectrum Transmitter
Description of EUT:	Video Monitor - Parent Unit
Serial Number:	N/A
Sample Receipt Date:	January 13, 2017
Date of Test:	January 20 to February 09, 2017
Report Date:	February 10, 2017
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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EXHIBIT 1
TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

1.0 Test Results Summary & Statement of Compliance

1.1 Summary of Test Results

Test Items	FCC Part 15 Section	RSS-247/ RSS-Gen# Section	Results	Details see section
Antenna Requirement	15.203	8.3#	Pass	2.1
Max. Conducted Output Power	15.247(b)(1) & (4)	5.4(2)	Pass	4.1
Max. 20dB RF Bandwidth	N/A	5.1(1)	N/A	4.2
Min. No. of Hopping Frequencies	15.247(a)(1)(iii)	5.1(4)	Pass	4.3
Min. Hopping Channel Carrier Frequency Separation	15.247(a)(1)	5.1(2)	Pass	4.4
Average Time of Occupancy	15.247(a)(1)(iii)	5.1(4)	Pass	4.5
Out of Band Antenna Conducted Emission	15.247(d)	5.5	Pass	4.6
Radiated Emission in Restricted Bands and Spurious Emissions	15.247(d)	8.10#	Pass	4.8
AC Power Line Conducted Emission	15.207 & 15.107	8.8#	Pass	4.9

Note: Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

1.2 Statement of Compliance

The equipment under test is found to be complying with the following standards:

FCC Part 15, October 1, 2015 Edition
RSS-247 Issue 1, May 2015
RSS-Gen Issue 4, November 2014

EXHIBIT 2
GENERAL DESCRIPTION

2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a Video Monitor - Parent Unit of Video Baby Monitor. It operates at frequency range of 2406MHz to 2475MHz. There are totally 24 non-overlapping channels with 3MHz channel separation and 17 active channels out of the 24 channels. The EUT is powered by a 100-240VAC 200mA to 5.0VDC 1000mA AC adaptor.

The antenna used in the EUT is integral, and the test sample is a prototype.

For FCC, the Model(s) VM5271-2 PU and VM5x71-ab PU are the same as model VM5271 PU in electronics/electrical designs including software & firmware, PCB layout and construction design/physical design/enclosure. The only differences between these models are color and model number to be sold for marketing purpose. Suffix (a, b, x) indicates different type packaging, different number of baby unit and different color of enclosure.

For IC, the Model(s): VM5271-2 PU is the same as the Model: VM5271 PU in electronics/electrical designs including software & firmware, PCB layout and construction design/physical design/enclosure. The only differences between these models are color and model number to be sold for marketing purpose.

The circuit description and frequency hopping algorithm are attached in the Appendix and saved with filename: descri.pdf.

2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2014). Preliminary radiated scans and all radiated measurements were performed in radiated emission test sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. Antenna port conducted measurements were performed according to ANSI C63.10 (2013). All other measurements were made in accordance with the procedures in 47 CFR Part 2.

2.3 Test Facility

The radiated emission test site, AC power line conducted measurement facility and antenna port conducted measurement facility used to collect the radiated data, AC Power Line conducted data, and conductive data are at Intertek Testing Services Hong Kong Ltd., which is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong. This test facility and site measurement data have been fully placed on file with FCC and Industry Canada No. 2042V.

EXHIBIT 3
SYSTEM TEST CONFIGURATION

3.0 **System Test Configuration**

3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to transmit / receive continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The EUT was powered by a 100-240VAC 200mA to 5.0VDC 1000mA adaptor.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the base unit attached to peripherals, they were connected and operational (as typical as possible). The parent unit was remotely located as far from the antenna and the base as possible to ensure full power transmission from the baby unit. Else, the base was wired to transmit full power with modulation.

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For any intentional radiator powered by AC power line, measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

For transmitter radiated measurement, the spectrum analyzer resolution bandwidth was 100 kHz for frequencies below 1000 MHz. The resolution bandwidth was 1 MHz for frequencies above 1000 MHz.

Radiated emission measurement for transmitter were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Receiver was performed from 30MHz to the fifth harmonic of the highest frequency or 40GHz, whichever is lower.

3.1 Justification - Cont'd

Emission that are directly caused by digital circuits in the transmit path and transmitter portion were measured, and the limit are according to FCC Part 15 Section 15.109.

Detector function for radiated emissions was in peak mode. Average readings, when required, were taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 4.8.3.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF.* The effective period (Teff) was referred to Exhibit 4.8.3. With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All relevant operation modes have been tested, and the worst case data is included in this report.

3.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

3.3 Details of EUT and Description of Accessories

Details of EUT:

An AC adaptor and/or a battery (provided with the unit) was used to power the device. Their description are listed below.

(1) An AC adaptor (100-240VAC 200mA to 5.0VDC 1000mA, Model: S006AKU0500100) (Supplied by Client)
(2) Operated Battery: 3.7VDC 950mAH Li-polymer type battery (Supplied by Client)

Description of Accessories:

(1) Baby Unit, Model: VM5271 BU, FCC ID: EW780-0621-00 (Supplied by Client)

3.4 Measurement Uncertainty

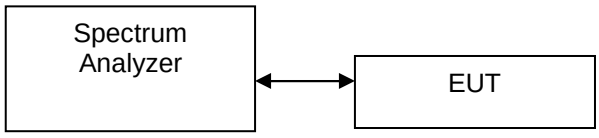
When determining of the test conclusion, the Measurement Uncertainty of test at a level of confidence of 95% has been considered. The values of the Measurement uncertainty for radiated emission test and RF conducted measurement test are ± 5.3dB and ±0.99dB respectively. The value of the Measurement uncertainty for conducted emission test is ±4.2dB.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

EXHIBIT 4
TEST RESULTS

4.0 **Test Results**

RF Conducted measurement Test Setup by a Spectrum Analyzer.
The figure below shows the test setup, which is utilized to make these measurements.



4.1 Maximum Conducted (peak) Output Power at Antenna Terminals

☐ The antenna power of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

☒ The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set for RBW>20dB bandwidth and power was read directly in dBm. External attenuation and cable loss were compensated for using the OFFSET function of the analyzer.

(Parent Unit) Antenna Gain = 2 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2406	17.41	55.081
Middle Channel: 2442	17.20	52.481
High Channel: 2475	17.02	50.350

Cable loss : 0.5 dB External Attenuation : 0 dB

Cable loss, external attenuation: ☒ included in OFFSET function
☐ added to SA raw reading

dBm max. output level = 17.41 dBm

Limits:
☒ 0.125W (21dBm) for antennas with gains of 6dBi or less

☐ 0.25W (24dBm) for antennas with gains of 6dBi or less

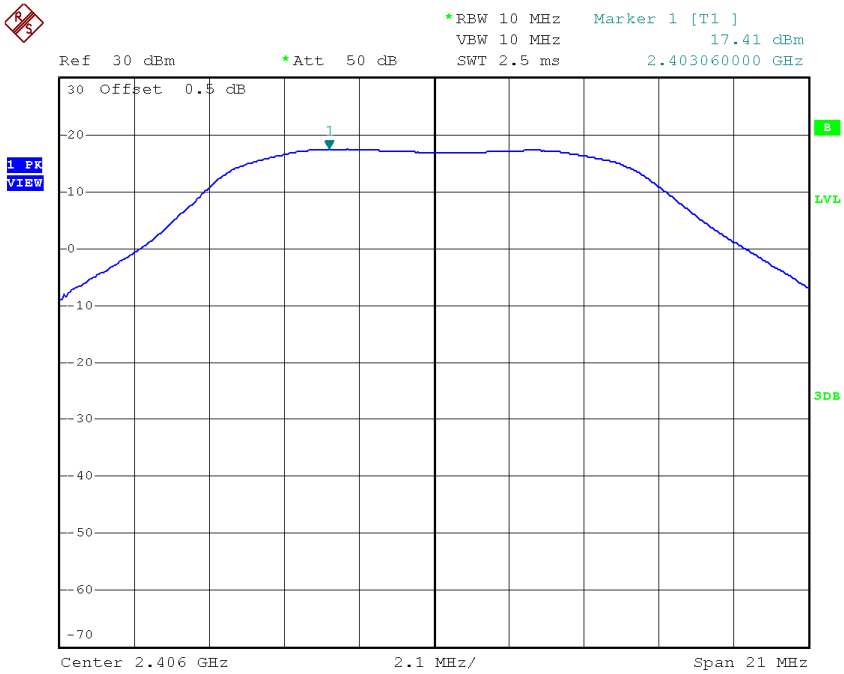
☐ 1W (30dBm) for antennas with gains of 6dBi or less

☐ ___W (___dBm) for antennas with gains more than 6dBi

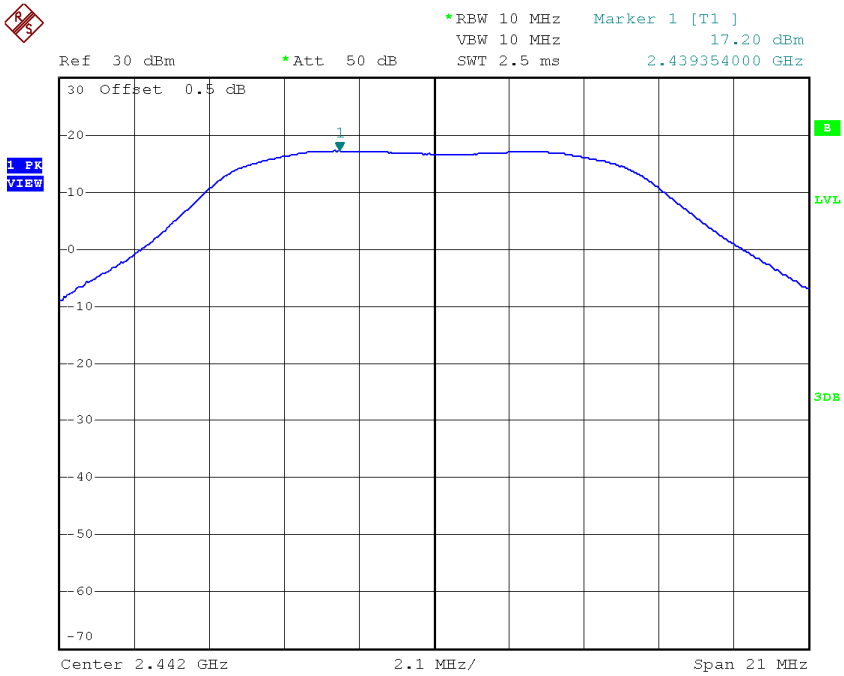
The plots of conducted output power are saved as below.

Plots of conducted output power

Lowest Channel

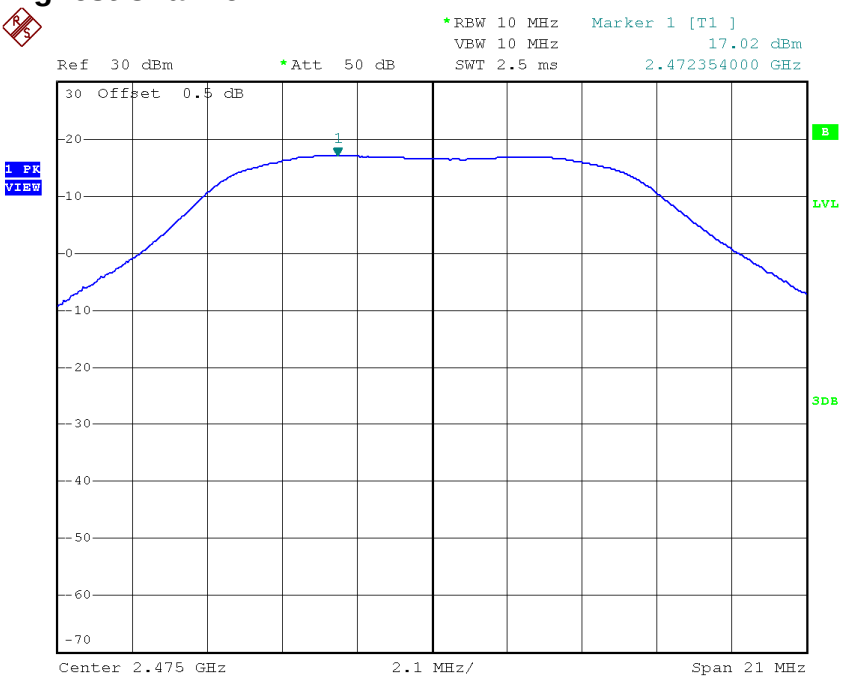


Middle Channel



Plots of conducted output power

Highest Channel



4.2 Maximum 20 dB RF Bandwidth

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 20 dB lower than PEAK level. The 20 dB bandwidth was determined from where the channel output spectrum intersected the display line.

Parent Unit	
Frequency (MHz)	20 dB Bandwidth (kHz)
Low Channel: 2406	4334
Middle Channel: 2442	4290
High Channel: 2475	4378

Limits

☐ ≤500kHz for 902-928MHz

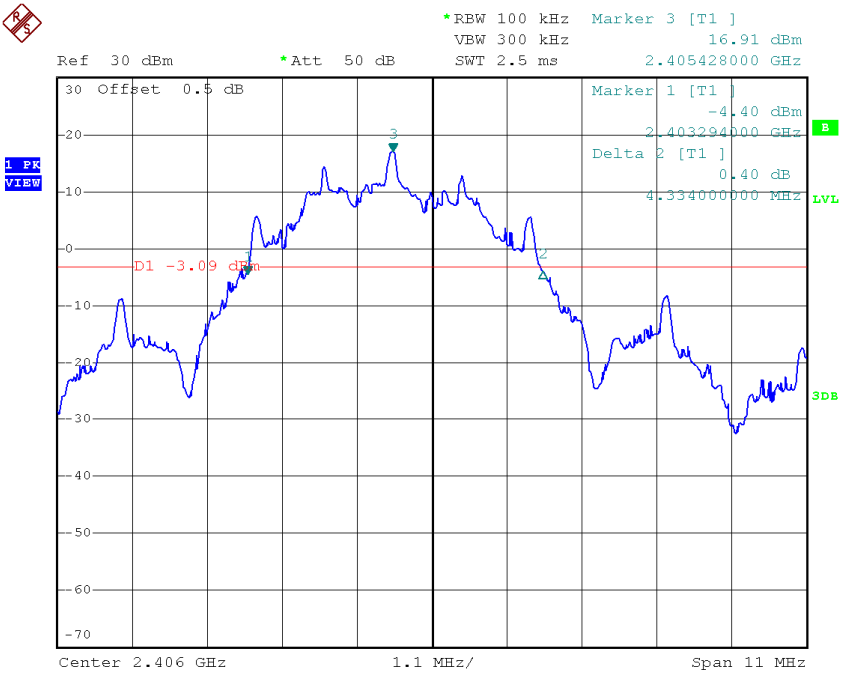
☒ N/A for 2400-2483.5MHz

☐ ≤1MHz for 5725-5850MHz

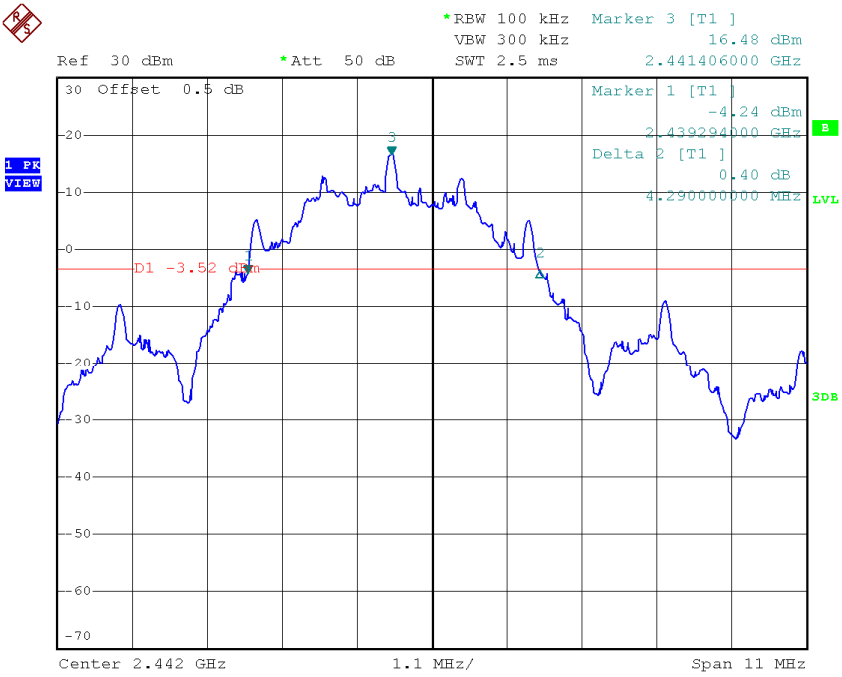
The plots of 20dB RF bandwidth are saved as below.

Plots of 20dB RF bandwidth

Lowest Channel

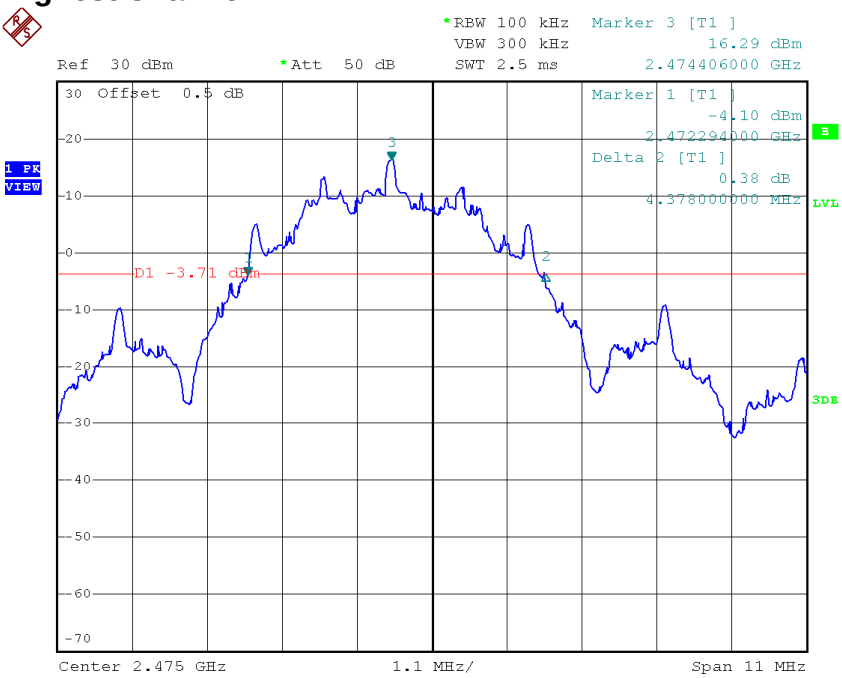


Middle Channel



Plots of 20dB RF bandwidth

Highest Channel



4.3 Minimum Number of Hopping Frequencies

With the analyzer set to MAX HOLD readings were taken for 2-3 minutes in each band. The channel peaks so recorded were added together, and the total number compared to the minimum number of channels required in the regulation.

Parent Unit	
No. of hopping channels	17

Minimum Requirements:

☐ at least 50 hopping channels for 902MHz-928MHz (20 dB bandwidth of hopping channel < 250kHz)

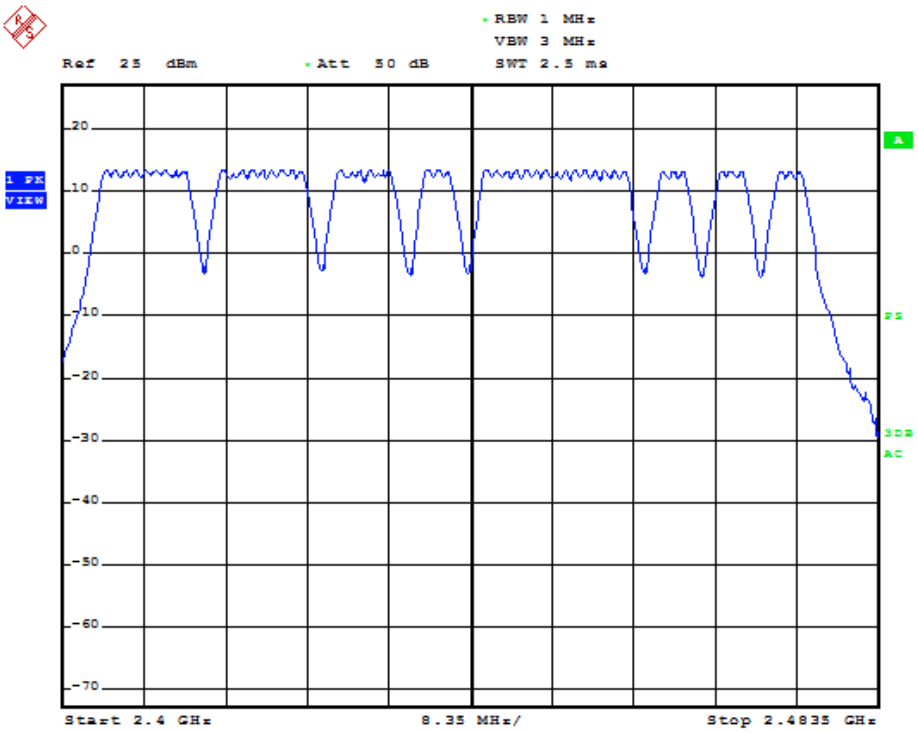
☐ at least 25 hopping channels for 902MHz-928MHz (20 dB bandwidth of hopping channel ≥ 250kHz)

☒ at least 15 hopping channels for 2400MHz-2483.5MHz.

☐ at least 75 hopping channels for 5725MHz-5850MHz.

The plots of number of hopping frequencies are saved as below.

Plots of Number of Hopping Frequencies
Plot A



4.4 Minimum Hopping Channel Carrier Frequency Separation

Using the DELTA MARKER function of the analyzer, the frequency separation between two adjacent channels was measured and met the requirement.

Parent Unit	
Channel Separation (Channel 1 and Channel 2)	3020

Limits:
The channel separation must be larger than:

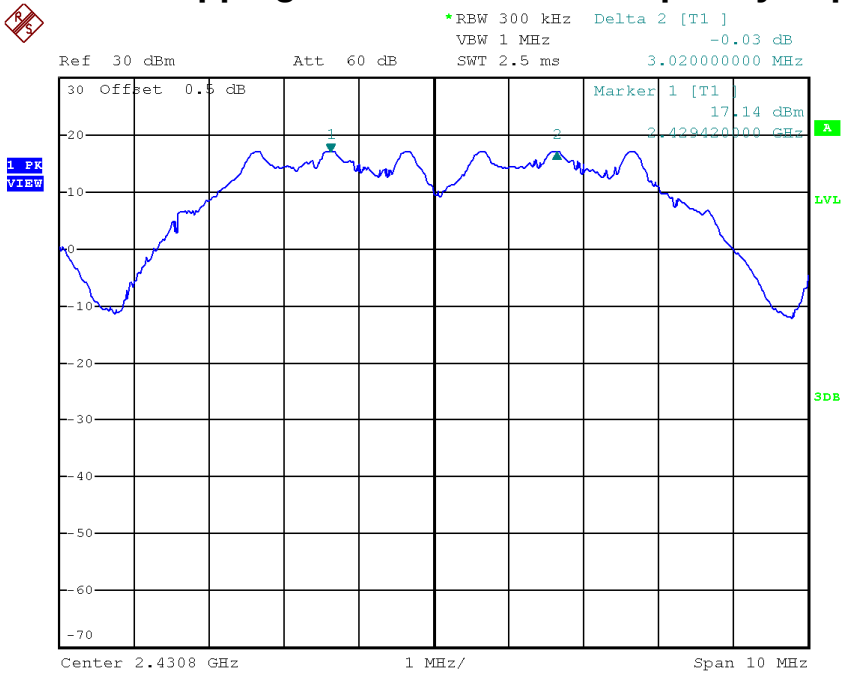
☐ 25 kHz

☐ 20 dB bandwidth of hopping channel: ___Hz

☒ 2/3 of 20dB bandwidth of hopping channel: 2919 kHz

The plot(s) of hopping channel carrier frequency separation is saved as below.

Plots of Hopping Channel Carrier Frequency Separation



4.5 Average Channel Occupancy Time

The spectrum analyzer center frequency was set to one of the known hopping channels. The SWEEP was set to 1ms, the SPAN was set to ZERO SPAN, and the TRIGGER was set to VIDEO. The time duration of the transmission so captured was measured with the MARKER DELTA function.

The SWEEP was then set to the time required by the regulation (20 seconds for 902-928 MHz devices, if the 20dB bandwidth is less than 250kHz, 10 seconds for 902-928 MHz if the 20dB bandwidth is or greater than 250kHz, "0.4 seconds x Number of hopping channels employed" seconds for 2400-2483.5 MHz, 30 seconds for 5725-5850 MHz). The analyzer was set to SINGLE SWEEP, the total ON time was added and compared against the limit (0.4 seconds).

Parent Unit (worst-case: 4 baby unit operation)	
Average Occupancy Time (Traffic – in a clear RF environment) =	0.45ms x 6 x 4 x 6.8 = 73.44ms

Limits:
Average 0.4 seconds maximum occupancy in:

☒ 6.8 seconds (0.4 sec. x 17) for 2400MHz-2483.5MHz
(Traffic – in a clear RF environment)

☐ 20 seconds for 902MHz-928MHz ≥ 50 hopping channels

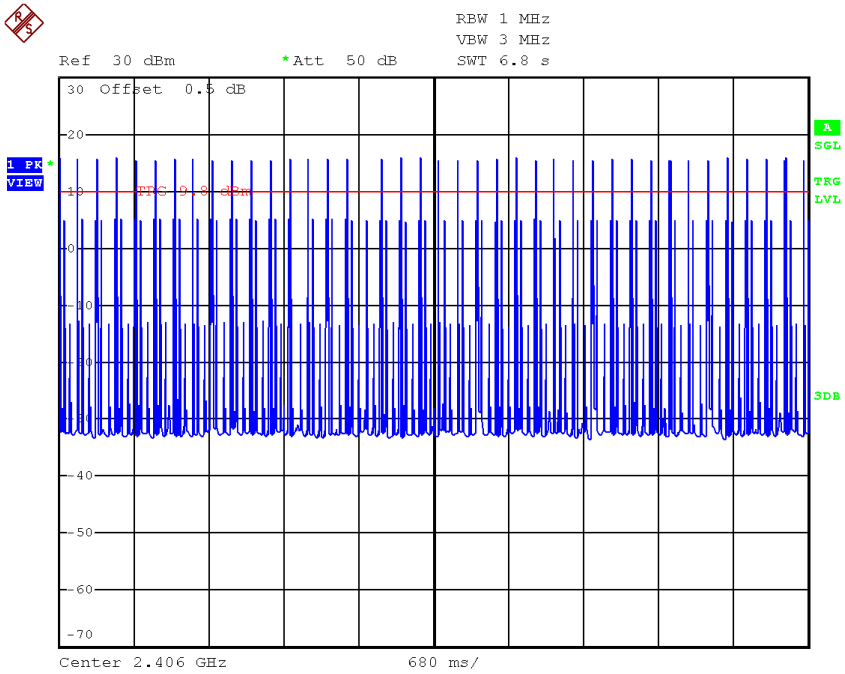
☐ 10 seconds for 902MHz-928MHz ≥ 25 hopping channels

☐ 30 seconds for 5725-5850MHz

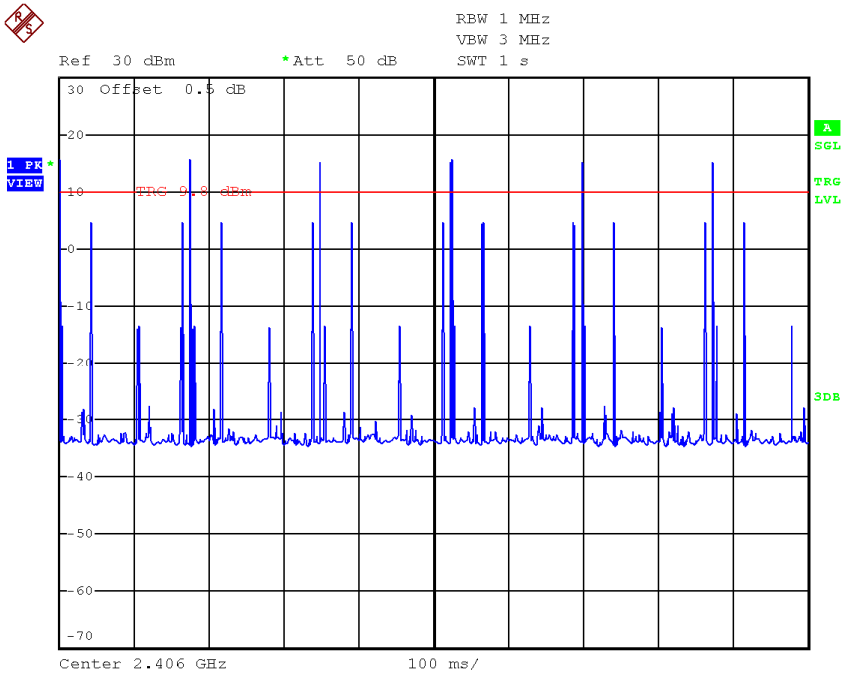
The plots of average channel occupancy time are saved as below.

Plots Average Channel Occupancy Time

Plot A

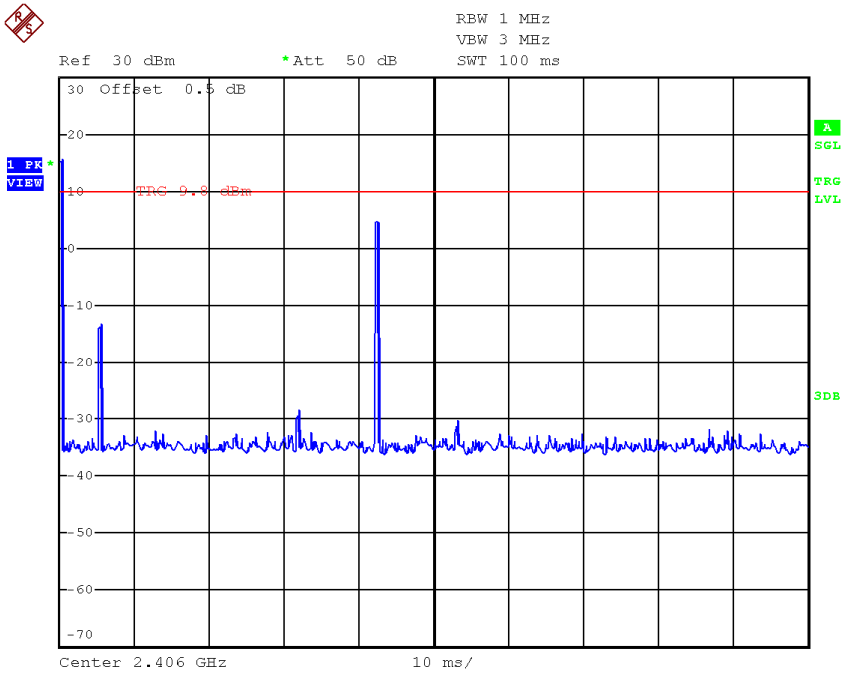


Plot B

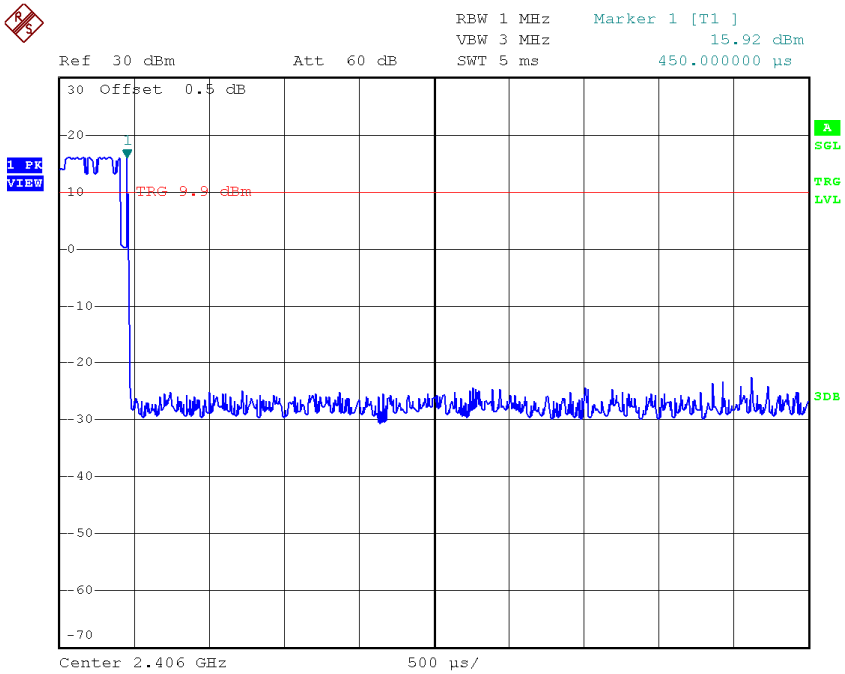


Plots Average Channel Occupancy Time

Plot C



Plot D



4.6 Out of Band Conducted Emissions

In any 100 kHz bandwidth outside the EUT passband, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

The plot(s) of bandedge compliance is shown the worst-case which has been already considered between enable and disable the hopping function of the EUT.

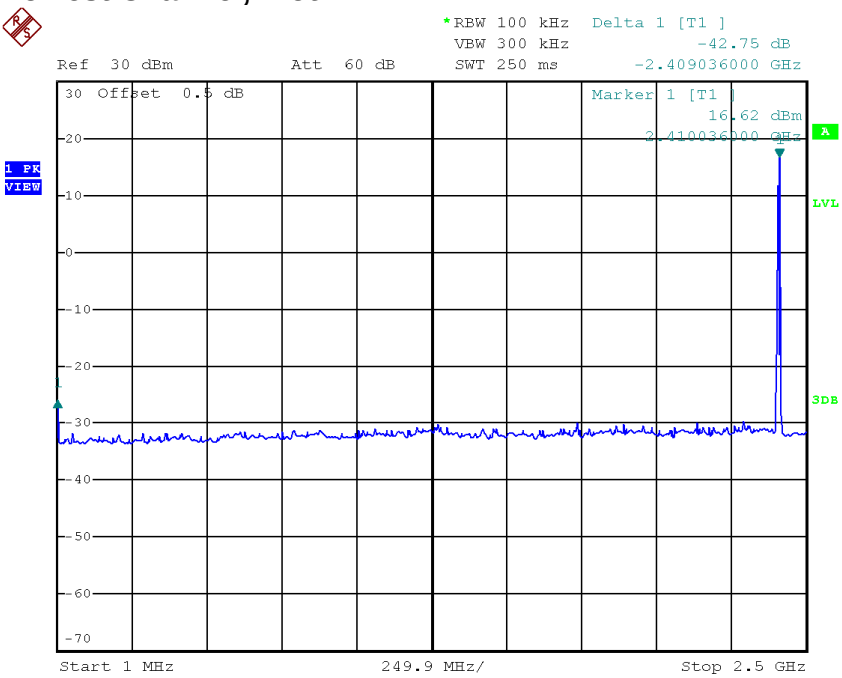
Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

Limits:
All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

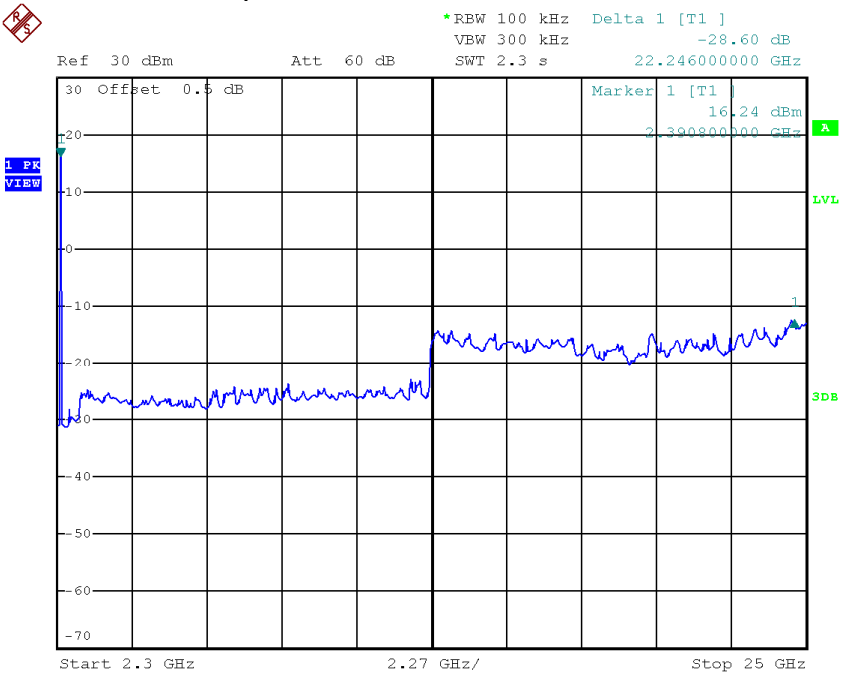
The plots of out of band conducted emissions are saved as below.

Plots of Out of Band Conducted Emissions

Lowest Channel, Plot 1

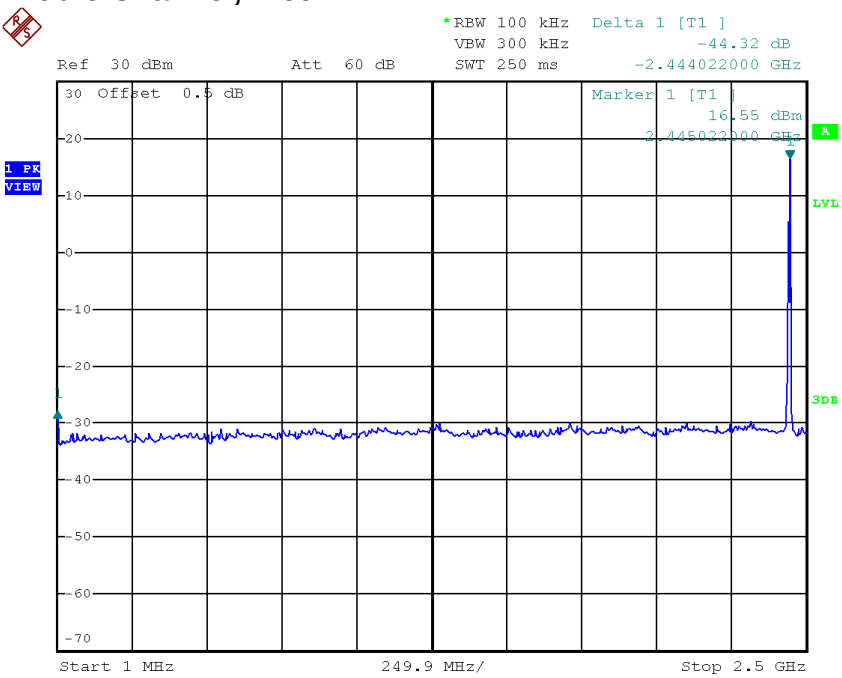


Lowest Channel, Plot 2

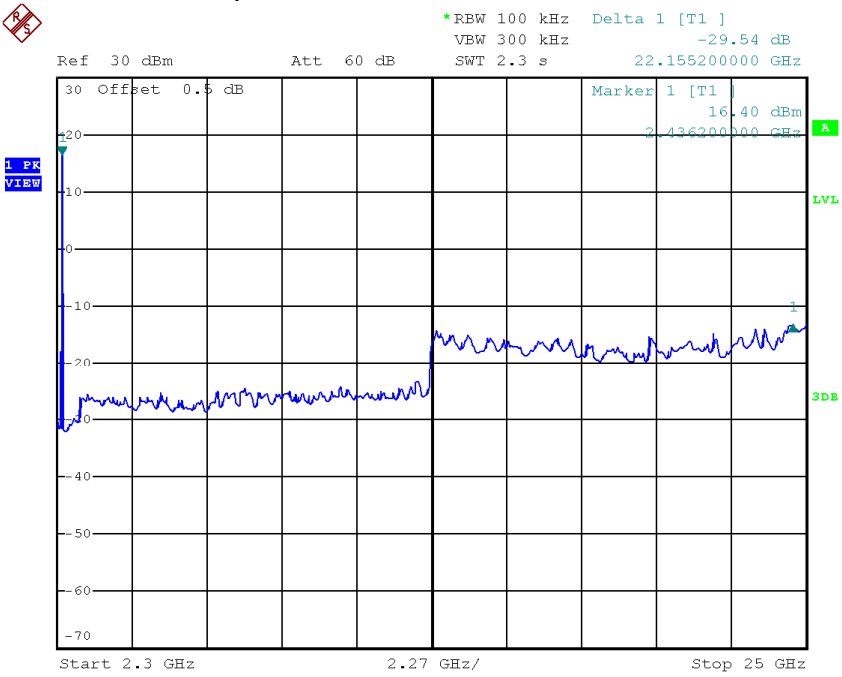


Plots of Out of Band Conducted Emissions

Middle Channel, Plot 1

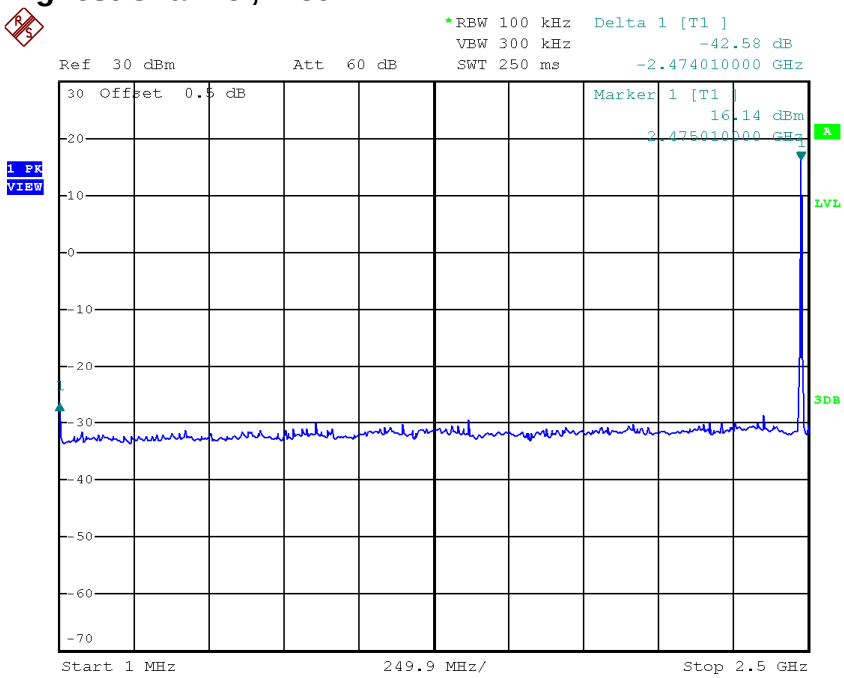


Middle Channel, Plot 2

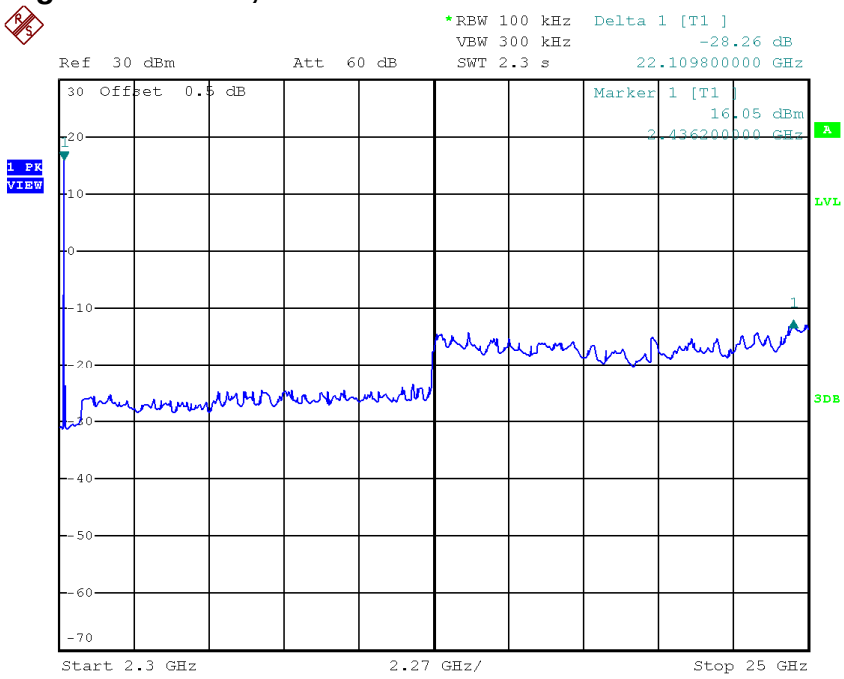


Plots of Out of Band Conducted Emissions

Highest Channel, Plot 1

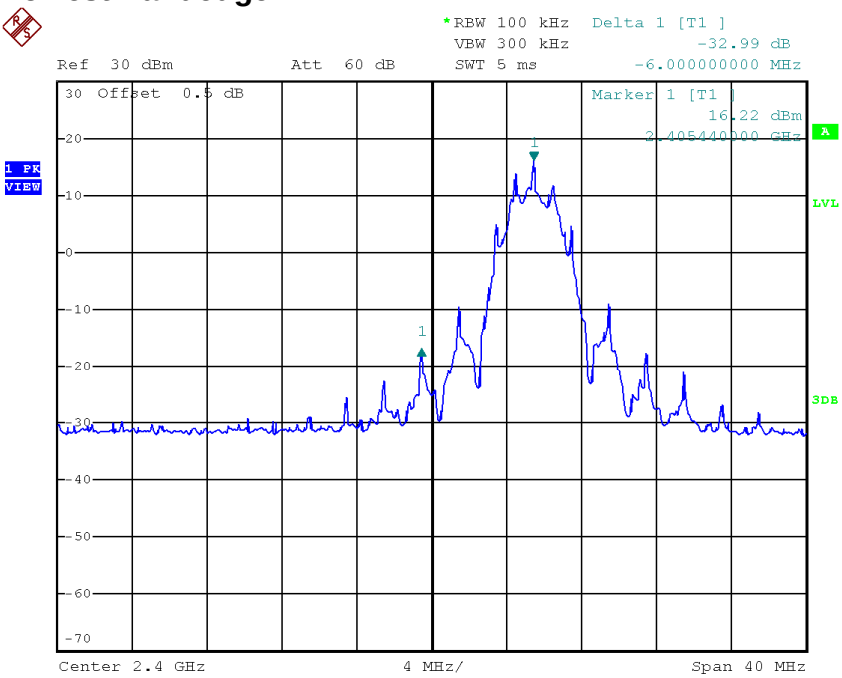


Highest Channel, Plot 2

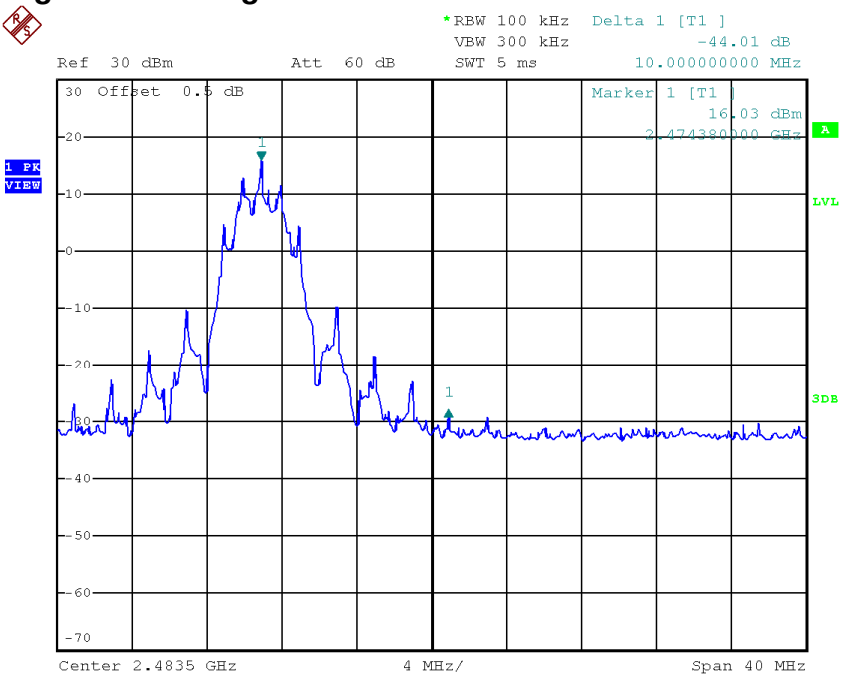


Plots of Bandedge

Lowest Bandedge



Highest Bandedge



4.7 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflects the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD +AV

Example
Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29 dB
PD = 0 dB
AV = -10 dB
FS = 62 + 7.4 +1.6 -29 +0 + (-10) = 32 dBμV/m

Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

4.8 Transmitter Radiated Emissions in Restricted Bands and Spurious Emissions

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

4.8.1 Radiated Emission Configuration Photograph

Worst Case Restricted Band Radiated Emission
at

Parent Unit: 416.060 MHz

The worst case radiated emission configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.8.2 Radiated Emission Data

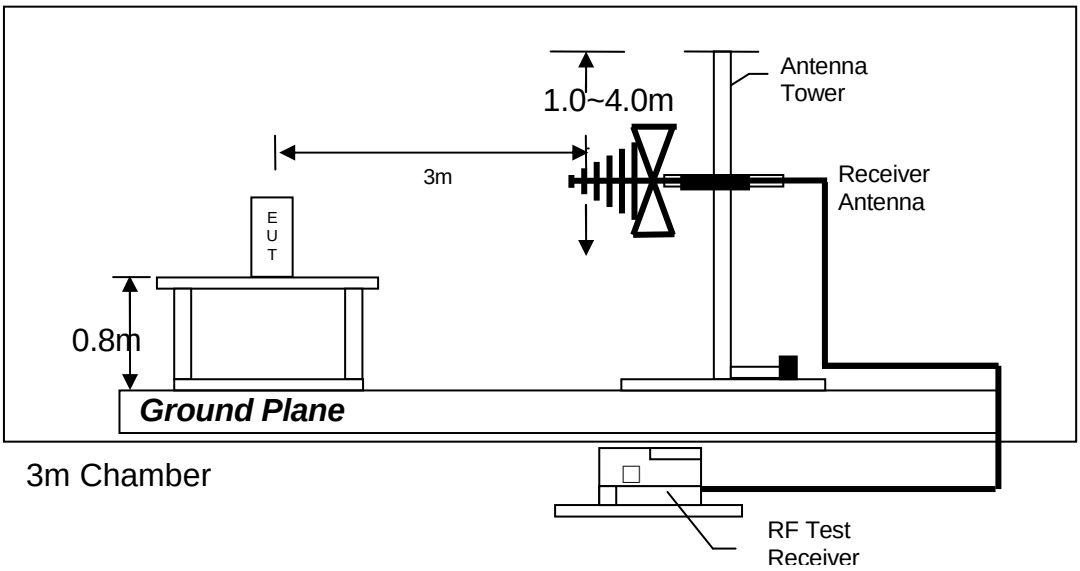
The data in tables 1-8 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

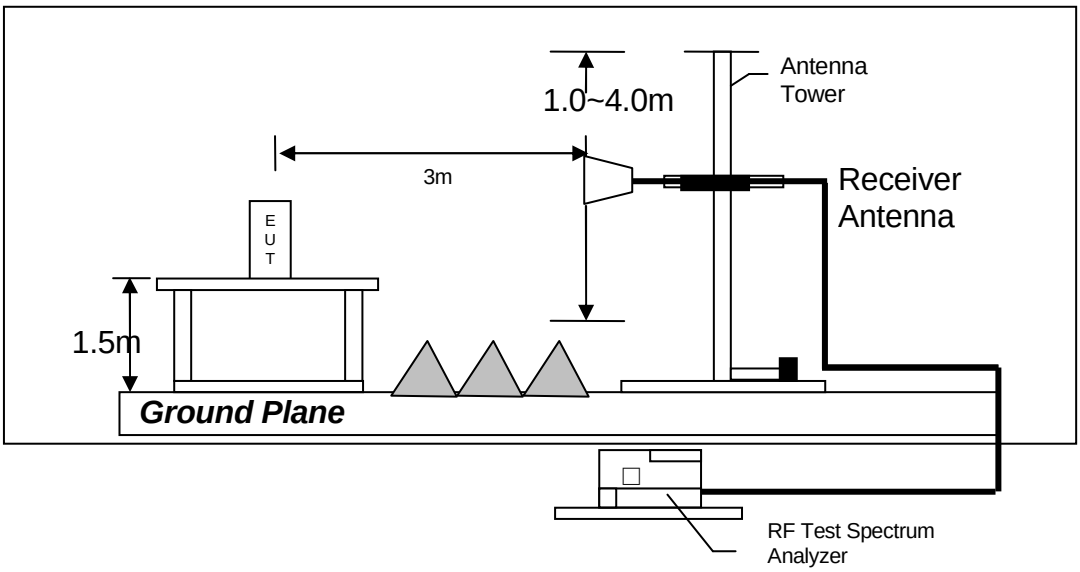
Parent Unit: Passed by 1.5 dB margin

4.8.3 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

Mode: TX-Channel 1

Table 1, Parent Unit

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	***2390.000***	***56.1***	***33***	***29.4***	***52.5***	***46.94***	***5.6***	***54.0***	***-48.4***
H	***4812.000***	***52.8***	***33***	***34.9***	***54.7***	***46.94***	***7.8***	***54.0***	***-46.2***
V	***12030.000***	***42.9***	***33***	***40.5***	***50.4***	***46.94***	***3.5***	***54.0***	***-50.5***

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	***2390.000***	***56.1***	***33***	***29.4***	***52.5***	***74.0***	***-21.5***
H	***4812.000***	***52.8***	***33***	***34.9***	***54.7***	***74.0***	***-19.3***
V	***12030.000***	***42.9***	***33***	***40.5***	***50.4***	***74.0***	***-23.6***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 2.2.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.

Mode: TX-Channel 13

Table 2, Parent Unit

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	***4884.000***	***52.4***	***33***	***34.9***	***54.3***	***46.94***	***7.4***	***54.0***	***-46.6***
H	***7326.000***	***40.5***	***33***	***37.9***	***45.4***	***46.94***	***-1.5***	***54.0***	***-55.5***
V	***12210.000***	***43.0***	***33***	***40.5***	***50.5***	***46.94***	***3.6***	***54.0***	***-50.4***

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	***4884.000***	***52.4***	***33***	***34.9***	***54.3***	***74.0***	***-19.7***
H	***7326.000***	***40.5***	***33***	***37.9***	***45.4***	***74.0***	***-28.6***
V	***12210.000***	***43.0***	***33***	***40.5***	***50.5***	***74.0***	***-23.5***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 2.2.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.

Mode: TX-Channel 24

Table 3, Parent Unit

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	***2483.500***	***72.3***	***33***	***29.4***	***68.7***	***46.94***	***21.8***	***54.0***	***-32.2***
H	***4950.000***	***52.4***	***33***	***34.9***	***54.3***	***46.94***	***7.4***	***54.0***	***-46.6***
H	***7425.000***	***40.5***	***33***	***37.9***	***45.4***	***46.94***	***-1.5***	***54.0***	***-55.5***
V	***12375.000***	***42.8***	***33***	***40.5***	***50.3***	***46.94***	***3.4***	***54.0***	***-50.6***

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	***2483.500***	***72.3***	***33***	***29.4***	***68.7***	***74.0***	***-5.3***
H	***4950.000***	***52.4***	***33***	***34.9***	***54.3***	***74.0***	***-19.7***
H	***7425.000***	***40.5***	***33***	***37.9***	***45.4***	***74.0***	***-28.6***
V	***12375.000***	***42.8***	***33***	***40.5***	***50.3***	***74.0***	***-23.7***

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 2.2.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.

Mode: TX Other

Table 4, Parent Unit

Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	63.950	40.4	16	9.0	33.4	40.0	-6.6
H	***117.300***	***34.2***	***16***	***14.0***	***32.2***	***43.5***	***-11.3***
H	159.980	37.9	16	16.0	37.9	43.5	-5.6
H	181.320	35.3	16	20.0	39.3	43.5	-4.2
H	***245.340***	***35.5***	***16***	***20.0***	***39.5***	***46.0***	***-6.5***
H	***277.350***	***34.0***	***16***	***22.0***	***40.0***	***46.0***	***-6.0***
V	352.040	35.6	16	24.0	43.6	46.0	-2.4
V	373.380	35.7	16	24.0	43.7	46.0	-2.3
H	384.050	34.7	16	24.0	42.7	46.0	-3.3
H	416.060	35.5	16	25.0	44.5	46.0	-1.5
H	448.070	33.9	16	26.0	43.9	46.0	-2.1
H	565.440	30.9	16	28.0	42.9	46.0	-3.1
H	640.130	30.7	16	29.0	43.7	46.0	-2.3
H	736.281	27.3	16	30.0	41.3	46.0	-4.7
H	876.446	24.5	16	32.0	40.5	46.0	-5.6

NOTES:
1. Peak detector is used for the emission measurement.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 2.2.

Mode: Talk

Table 5, Parent Unit

Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	59.948	33.7	16	10.0	27.7	40.0	-12.3
V	107.963	41.2	16	14.0	39.2	43.5	-4.3
V	191.990	39.1	16	16.0	39.1	43.5	-4.4
V	203.993	41.1	16	16.0	41.1	43.5	-2.4
H	288.020	33.7	16	22.0	39.7	46.0	-6.3
V	352.040	35.5	16	24.0	43.5	46.0	-2.5
V	384.050	36.4	16	24.0	44.4	46.0	-1.6
V	416.060	35.1	16	25.0	44.1	46.0	-1.9
V	448.070	30.5	16	26.0	40.5	46.0	-5.5
V	512.211	25.6	16	27.0	36.6	46.0	-9.4
H	640.130	31.0	16	29.0	44.0	46.0	-2.0
H	***960.351***	***25.5***	***16***	***33.0***	***42.5***	***54.0***	***-11.5***

NOTES: 1. Peak detector is used for the emission measurement.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 2.2.

Mode: Talk Back

Table 6, Parent Unit

Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	59.948	33.3	16	10.0	27.3	40.0	-12.7
V	107.963	40.3	16	14.0	38.3	43.5	-5.2
V	192.210	39.1	16	16.0	39.1	43.5	-4.4
V	203.966	41.0	16	16.0	41.0	43.5	-2.5
H	287.960	33.7	16	22.0	39.7	46.0	-6.3
V	352.245	34.4	16	24.0	42.4	46.0	-3.6
V	384.186	34.4	16	24.0	42.4	46.0	-3.6
V	416.060	35.2	16	25.0	44.2	46.0	-1.8
V	447.682	30.6	16	26.0	40.6	46.0	-5.4
V	512.225	25.5	16	27.0	36.5	46.0	-9.5
H	640.100	31.0	16	29.0	44.0	46.0	-2.0
H	***961.459***	***24.5***	***16***	***33.0***	***41.5***	***54.0***	***-12.5***

NOTES: 1. Peak detector is used for the emission measurement.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-247 Section 2.2.

4.8.4 Transmitter Duty Cycle Calculation

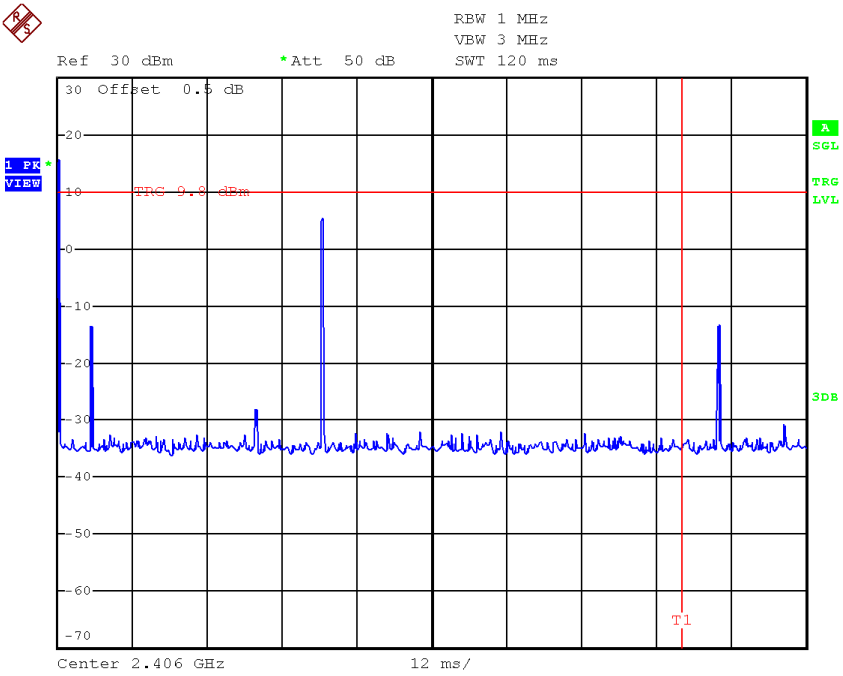
Duty Cycle (DC) = (Maximum ON time in 100 ms) / (100 ms)
= 0.45 ms x 1 / 100 ms

Average Factor (AF) = 20 log(DC)
= 20* log (0.0045)
= -46.94 dB

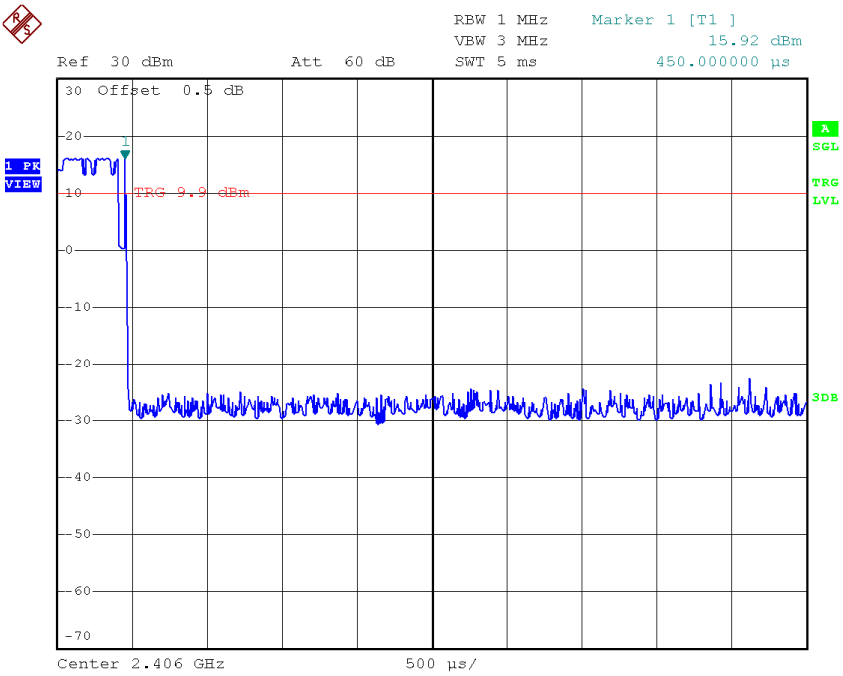
The plot(s) shows the bit timing is saved as below.

Plots of transmitter Duty Cycle

Plot A



Plot B



4.9 AC Power Line Conducted Emission

☐ Not applicable – EUT is only powered by battery for operation.

☒ EUT connects to AC power line. Emission Data is listed in following pages.

☐ Base Unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

4.9.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at

397.5 kHz

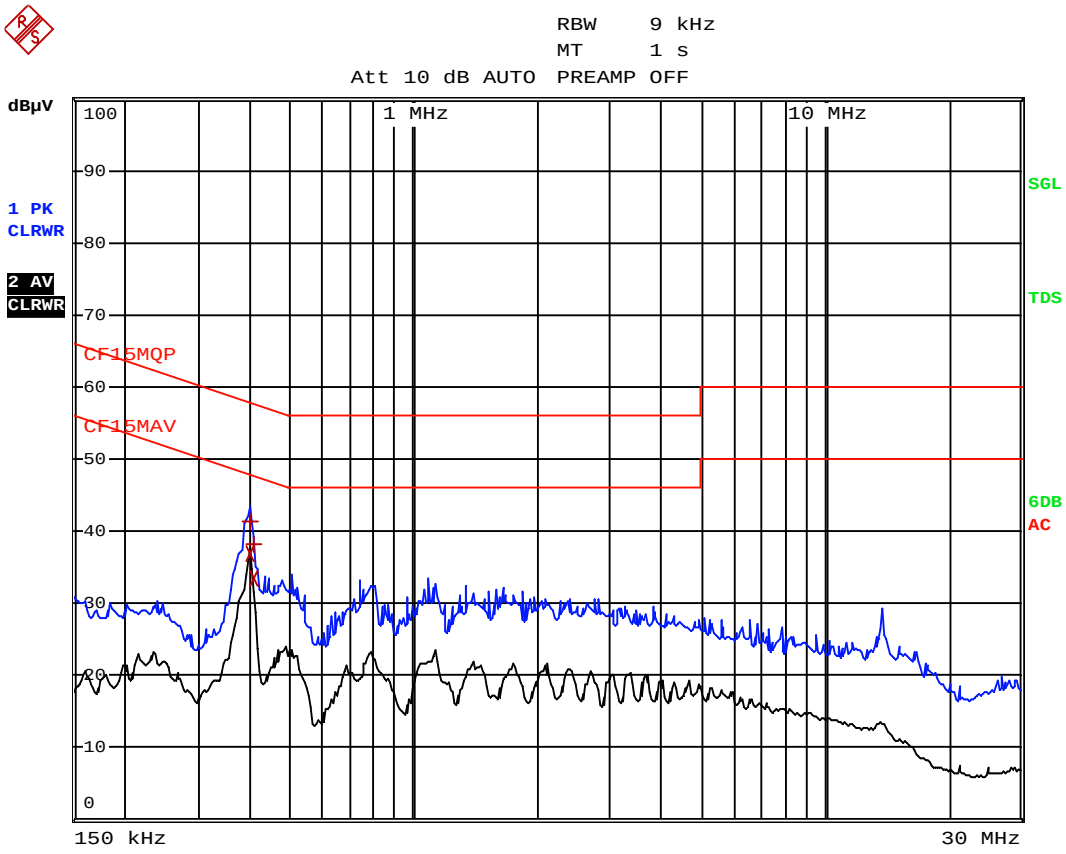
The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.9.2 AC Power Line Conducted Emission Data

The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance.

Passed by 10.37 dB margin compare with CISPR average limit

Worst Case: Talk and Music



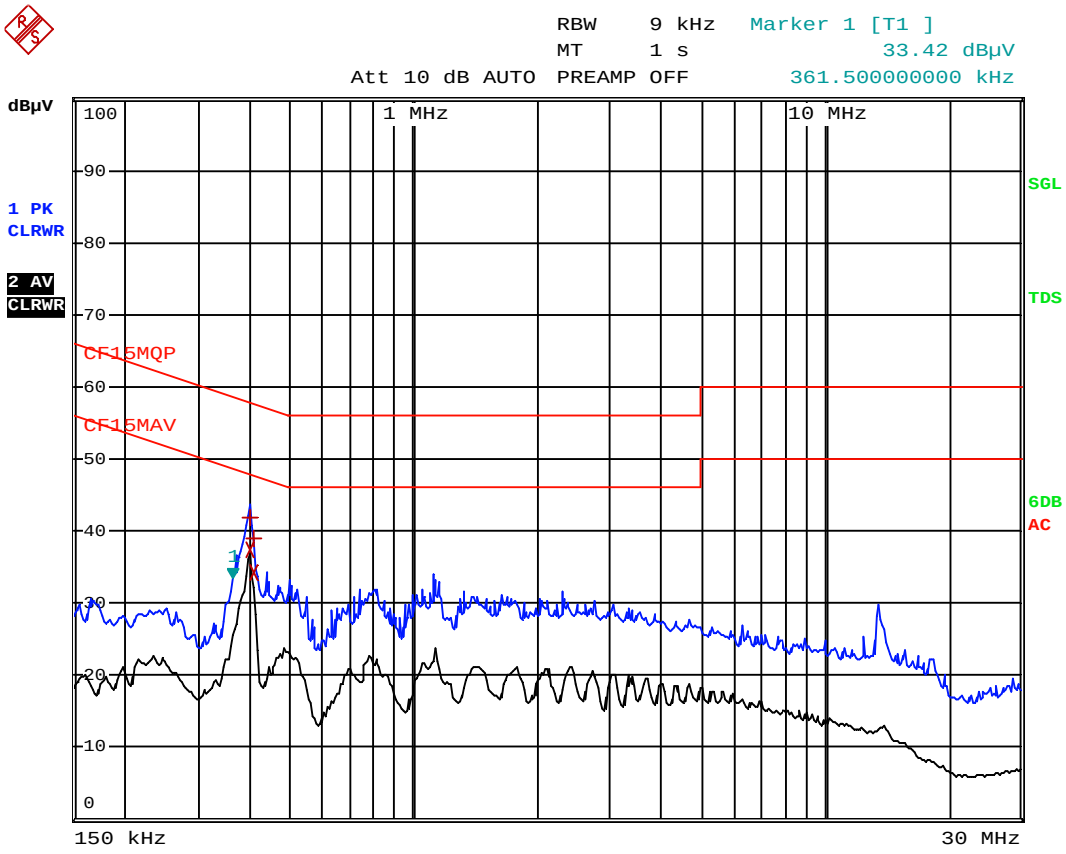
Worst Case: Talk and Music

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	397.5 kHz	41.29	L1	-16.61
2	CISPR Average	397.5 kHz	36.86	L1	-11.04
1	Quasi Peak	406.5 kHz	38.17	L1	-19.54
2	CISPR Average	406.5 kHz	33.36	L1	-14.35

Worst Case: Talk Back



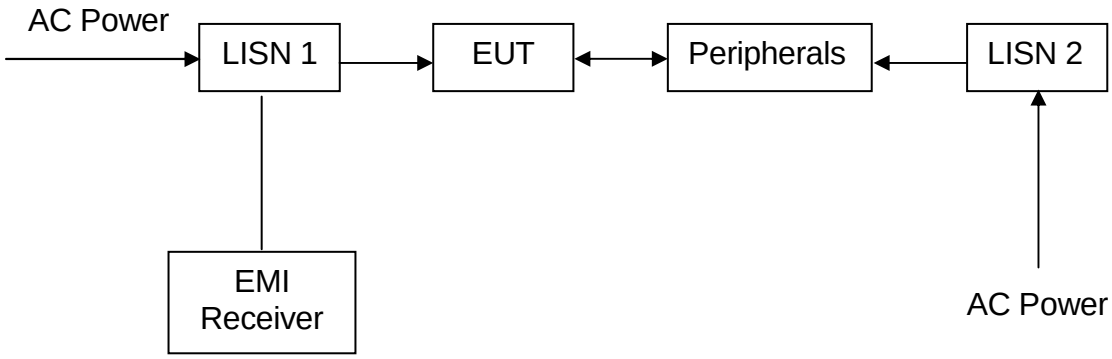
Worst Case: Talk Back

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	397.5 kHz	41.92	L1	-15.98
2	CISPR Average	397.5 kHz	37.53	L1	-10.37
1	Quasi Peak	406.5 kHz	38.92	L1	-18.79
2	CISPR Average	406.5 kHz	34.23	L1	-13.48

4.9.3 AC Line Conducted Emission Test Setup



The EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were moved to find the maximum emission.

EXHIBIT 5
EQUIPMENT LIST

5.0 **Equipment List**

1) Radiated Emissions Test

Equipment	Spectrum Analyzer	Biconical Antenna	EMI Test Receiver
Registration No.	EW-2253	EW-0571	EW-3095
Manufacturer	R&S	EMCO	R&S
Model No.	FSP40	3104C	ESCI
Calibration Date	Jun. 15, 2016	May 18, 2016	Oct. 25, 2016
Calibration Due Date	Jun. 15, 2017	Nov. 18, 2017	Oct. 25, 2017

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna
Registration No.	EW-0447	EW-1133
Manufacturer	EMCO	EMCO
Model No.	3146	3115
Calibration Date	May 18, 2016	Nov. 05, 2015
Calibration Due Date	Nov. 18, 2017	May 05, 2017

2) Conducted Emissions Test

Equipment	EMI Test Receiver (9kHz to 26.5GHz)	Artificial Mains	Pulse Limiter
Registration No.	EW-3156	EW-0192	EW-3248
Manufacturer	R&S	R&S	R&S
Model No.	ESR26	ESH3-Z5	ESH3-Z2
Calibration Date	Dec. 06, 2016	Aug. 26, 2016	Oct. 12, 2016
Calibration Due Date	Dec. 06, 2017	Aug. 26, 2017	Oct. 12, 2017

3) Conductive Measurement Test

Equipment	Spectrum Analyzer
Registration No.	EW-2466
Manufacturer	R&S
Model No.	FSP30
Calibration Date	Oct. 03, 2016
Calibration Due Date	Aug. 20, 2017

END OF TEST REPORT